THE

JOURNAL

OF

THE ASIATIC SOCIETY

OF

BENGAL.

VOL. I.

THE

JOURNAL

OF

THE ASIATIC SOCIETY

OF

BENGAL.

EDITED BY

JAMES PRINSEP, F. R. S.

SECRETARY OF THE PHYSICAL CLASS, ASIATIC SOCIETY.

VOL. I.

JANUARY TO DECEMBER,

1832.

"It will flourish, if naturalists, chemists, antiquaries, philologers, and men of science, in different parts of *Asia*, will commit their observations to writing, and send them to the Asiatic Society at Calcutta; it will languish, if such communications shall be long intermitted; and it will die away, if they shall entirely cease."

SIR WM. JONES.

Calcutta:

PRINTED AT THE BAPTIST MISSION PRESS, CIRCULAR ROAD.

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1832.

TO

CAPTAIN JAMES D. HERBERT,

Bengal Infantry,

LATE

DEPUTY SURVEYOR GENERAL OF BENGAL, AND SUPERINTENDENT OF REVENUE SURVEYS;

AT PRESENT HOLDING THE APPOINTMENT OF

ASTRONOMER TO HIS MAJESTY

The King of Oude:

WHOSE JUDGMENT ORIGINATED; WHOSE PERSEVERANCE AND EXERTIONS SUCCESSFULLY ESTABLISHED; AND WHOSE SUPERIOR ABILITIES SUPPORTED FOR 3 YEARS,

THE FIRST JOURNAL

IN INDIA

DEVOTED TO THE EXCLUSIVE PUBLICATION

OF

GLEANINGS IN SCIENCE;

THIS VOLUME,

IN ALL RESPECTS, BUT TITLE, A CONTINUATION OF HIS OWN WORK,

IS

Inscribed,

BY HIS ATTACHED FRIEND,

THE EDITOR.

CALCUTTA,
January 1, 1833.

PREFACE.

The Asiatic Society, on the 7th March, 1832*, passed a resolution, that the monthly journal hitherto published under the name of "Gleanings in Science," should be permitted to assume that of Journal of the Asiatic Society, and to continue it as long as the publication remains under the charge of one or both of the Secretaries of the Society. This privilege has, as it was anticipated, been the means of extending very considerably its circulation, while it has given a character and authenticity to the work, by its connection with an institution of established literary reputation, which no anonymous magazine, however well conducted, could hope to command.

The advantages of extended circulation have reacted to the benefit of subscribers, by enabling the Editor to increase the quantity of letter press from 400 to nearly 600 pages; and yet so constant has been the growing support of its contributors, that the pages of the Journal have been devoted, with few exceptions, to the insertion of original communications.

To many readers it would doubtless have been preferable that the Journal should contain more copious extracts from English scientific periodicals, which are not procurable in the interior of India; but conceding that, as an organ of Indian scientific intelligence, it must obviously derive its only merit among the many similar periodicals of the present day, from its stores of *oriental* literary and physical research, it will be generally acknowledged, that the first object of the work should be to give publicity to such oriental matter as the antiquarian, the linguist, the traveller, and the naturalist may glean, in the ample field open to their industry in this part of the world. While acting

* The January number was not published until the middle of March.—Since then exertions have been made to bring up arrears, and in future each monthly number will appear with regularity on the 10th of the following month; the insertion of the meteorological register rendering an earlier issue impossible.

on this principle, however, the Editor has not lost sight of the great utility of following, as far as means would permit, the progress of the various sciences at home, especially such as are connected in any way with Asia; the only limits thereto being want of space, and want of time to peruse and extract from the vast number of publications of the present day. Want of room also precluded the possibility of republishing the proceedings of the Medical and of the Horticultural Societies; but this had become less urgent since both of those useful bodies adopted the excellent rule of giving early publicity to their own proceedings and records.

To the Asiatic Society THE JOURNAL has naturally looked for its most frequent and interesting communications; and in consequence of its more intimate connection with that Institution, the proceedings of that body have been given in greater detail than heretofore, so that absent members may learn exactly what passes at its meetings, and what accessions are made from time to time to its library and its museum. Many absent members have complained of the quarterly subscriptions they were heretofore called upon to pay, while they remained in ignorance of what was going forward; this source of objection is now obviated, and perhaps a still greater amendment may yet be effected for their benefit, by an arrangement that all-members of the Society shall receive a copy of the Journal gratis, which will reduce their annual payments nearly one fourth.

It is unnecessary to recapitulate the contents of the present volume, or to allude in anonymous praise to those who have favored its pages with their assistance; since the authors have, in most cases, on suggestion, permitted their writings to be authenticated by the insertion of their names, as should always be the case in matters of fact, observation, and research. One illustrious name however must not be passed over without a tribute of gratitude for its valued and frequent contributions, a tribute more sincerely paid, since India has now lost the power and the claim to their continuance; she has resigned her most eminent oriental scholar to climes where his talents may find more genial appreciation, but where they cannot excite more respect or admiration, than they will ever command in the land which called forth their energies and directed their application.

The learned Societies at home will be proud to publish the continuation of the *Analyses of the Purânas*, of which the four first have appeared in these pages. Abstracts of four only were ready for the press, but translations of the remainder of the eighteen *Purânas* themselves had been completed under the superintendence of Professor Wilson, before he quitted India.

Mr. Alexander Csoma's indefatigable labour, in opening to us a first acquaintance with the literature of Tibet, will be estimated as it deserves by literary men—a contracted circle perhaps, because deep erudition and study are requisite to form critics capable of appreciating the nature and bearing of his peculiar researches upon the history, languages, and religions of other nations, both ancient and modern. All may however feel sensible of the devotion, zeal, and perseverance, which are necessary to lead a man, alone and unpaid, into a distant and wild country, to learn its language, and study its people at the fountain head. The volumes of notes which Mr. Csoma has presented to the Asiatic Society, will, it is hoped, be published in their Researches at length.

In furtherance of the desire of the Government, the greater part of Dr. Buchanan's Statistics of Dinajpúr has been printed in a detached form, as commenced by the Editor of the GLEANINGS; and to complete the work more speedily, two extra numbers have been issued in the course of the year. It will be remarked, that there are many plates referred to in the text: the drawings alluded to are in possession of the Honorable Court of Directors, along with the original manuscripts; it was thought better to preserve the references, in case the Hon'ble Court might hereafter be persuaded to publish them, either in a separate form, or of a size adapted to the present edition. It must not be forgotten, that it is this undertaking which gained to the GLEANINGS the valuable privilege of free postage through the Bengal Presidency. The Editor is happy to announce, that the same boon has, in the most liberal manner, and without any solicitation, been extended to the Presidency of Bombay and to the Government of Ceylon, by their enlightened Governors, His Excellency the Earl of CLARE, and the Right Honorable Sir R. W. HORTON, to whom his thanks are thus publicly and respectfully addressed.

To his numerous correspondents, the Editor can but proffer thanks for past, and solicitations for future, support, bidding them remember that, the scope and object of this publication embraces the literature, the manners, the geography, physical and mineral, the arts, the natural productions of Asia, the phenomena of its climate, and observations of the heavens. In the words of the illustrious founder of the Asiatic Society, " the bounds of its investigation will be the geographical limits of Asia; and within these limits its inquiries will be extended to whatever is performed by man or produced by nature."

Dedicated, by permission, to

LADY W. C. BENTINCK,

A

TREATISE

ON

THE MUSIC OF HINDOOSTAN,

COMPRISING A DETAIL OF

THE ANCIENT THEORY

AND

MODERN PRACTICE.

THE similarity of the music of Egypt and Greece to that of this country has been traced and pointed out: harmony and melody have been compared: and time noticed. The varieties of song have been enumerated, and the character of each detailed: a brief account of the principal Musicians superadded, and the work concluded with a short alphabetical glossary of the most useful musical *Terms*.

BY

CAPTAIN N. WILLARD,

Commanding in the Service of H. H. the Nuwab of Banda.

Price to Subscribers, Sa. Rs. 8.

PROSPECTUS.

A TREATISE on the Music of Hindoostan was much wanted. The scanty information obtainable through the channels of Dr. GILCHRIST and Sir WILLIAM JONES, are neither of themselves sufficient to fill this chasm, nor do they elicit light sufficient to enable one to grope through the various obscure writings in the vernacular languages and dialects. The songs set to music by Mr. BIRD and Mr. WALKIER, are of the more modern style, and not of the ancient school; so that, instead of elucidating the theory, they lead us into confusion, when compared with the tables of Rags and Raginees given by Sir W. JONES.

The forthcoming work has been written with the view of describing in some measure, the theory and practice of the original music of Hindoostan, but chiefly to unfold the beauties of which it is susceptible. The extravagant eulogium offered to the music of ancient Greece, and the striking similarity which appeared to the author to exist between that and the subject to be treated of in this work, has led him to point them out, in the hope that, should a taste for the music of this country obtain among the professors of the science in Europe, it might perhaps conduce to the elucidation and revival of a much-desired and lost branch of knowledge, namely, the music of ancient Egypt and Greece.

For this purpose it appeared to the author, that a bare translation of any of the existing native works would not suffice. All who have been taught music are so much accustomed to the European way of explaining it, that every other must necessarily appear uncouth and preposterous. In the arrangement of this work, therefore, the European system has been adopted.

CONTENTS.

N. B. *The work will be printed on superior English paper, at the Baptist Mission Press, Calcutta.*

Subscriptions will be received by Mr. A. Jewell, Moorghehuttah, and Messrs. Thacker and Co. St. Andrew's Library.

CONTENTS.

No. 1.—JANUARY.

No. 2.—FEBRUARY.

No. 3.—MARCH.

No. 4.—APRIL.

No. 5.—MAY.

DIRECTIONS TO THE BINDER.

The sheets of Buchanan's Statistics are to be separated from the monthly numbers. The Plates may either be bound up at the end of the volume, or in the following order :

ERRATA.

Page 10 line 9 *for* "wool," *read* "wood."
—— 11 — 7 *from bottom, for* "plate 1, fig. 2," *read* "plate 2, fig. 1."
—— 14 *last line, for* "delomite," *read* "dolomite."
—— 19 — 16 *from bottom, for* "3, 4, 5," *read* "1, 2, 3, 4."
—— 20 — 8 *from top, for* "plate 1," *read* "plate 2."
—— 20 — 9 *for* "he protracted," *read* "the protracted."
—— — — 11 *for* "BB″ B′," *read* "B″ B′."
—— — — 16 *for* "intercepts," *rsad* "intersects."

AND

In Fig 2, *plate II.* continue the dotted arc 1′ 1 *a″* to *a′*.
The line A *c′* continue to *c*.

—— 28 — 7 *from top, for* "manima," *read* "minima."
—— — *at bottom, for* "Artesien," *read* "Artesian."
—— 33 — 7 *for* "January," *read* "February."
—— 410 — — *in last column* of Table II. *for* "2m. 58s. 8," *read* "0m. 58s. 8."
—— 46 — 18 *from top, after* "which" *insert* "comma."
—— — — — ———————— "either" ditto.
—— 47 — 2 *from top, for* "have," *read* "has."
—— 57 — 12 *for* "$99\frac{1}{4}$ $99\frac{1}{2}$ $99\frac{3}{4}$," *read* "99^1 99^2 99^3."
—— 59 — 24 *and throughout the article, for* "sack," *read* "sac."
—— 60 — 4 "orbitar," *read* "orbital."
—— — — 10 "interval," *read* "internal."
—— — — 29 "lips," *read* "tips."
—— — — 34 *dele* "by."
—— 60 — 15 *for* "compressed and hard; before," *read* "compressed and hard before;"
—— — — 28 *for* "lips," *read* "tips."
—— 62 — 11 *for* "this Chiru," *read* "the Chiru."
—— 63 — 10 *for* "bambdoidal," *read* "lambdoidal."
—— — — 14 *for* "malars," *read* "molars."
—— 65 — 8 *for* "$1\frac{1}{8}$," *read* "$\frac{3}{1\,6}$."
—— 67 — 2 *from bottom, after* "than," *read* "the."
—— 74 — 15 *for* "9°," *read* "9^h."
—— 75 — 21 *dele* "rufous," repeated.
—— 79 — 17 *from bottom, for* "done," *read* "donc."
—— 148 — — *foot note, for* "Rutboo," *read* "Kubboo."
—— 226 1st par. 5th line *for* "Ekadantashtra," *read* "Ekadanshtra,"
—— 226 4th „ 4th — *for* "Kridama," *read* "Srid'ama"
—— 229 2nd „ 5th — *for* "Vrishapati," *read* "Vrihaspati."
—— 231 — „ 3rd — *for* "Viswasé na" *read* "Viswakerma."
—— 238 — „ *after* "Ganges river," *insert* "at Gházipur."
—— 245 10 „ *from bottom, for* "it," *read* "the mirror."
—— — 1st „ 7th — *for* "He having," *read* "Having."
—— 296 line 3 *for* "but mostly," *read* "and,—"
—— — — 7 *for* "hydrogen. When," *read* "hydrogen, where."
—— 305 — 20 *for* "circumference," *read* "diameter."
—— — — 21 *for* "$27\frac{1}{2}$ rupees," *read* "$2\frac{1}{2}$ rupees."

Errata in Meteorological Register, for June.

Date	Hour.		Bar.		
13	Sun-rise,	*for*	,365	*read*	,465
14	„		,399		,499
22	„		,517		,617

Add 0,010 to all the figures in the Barometrical column for 10½ P. M.

—— 340 — 6 *after* "*Rhinolphus*," *insert* "and two species of *Vespertilio*."
—— 355 — 13 *for* "ακανσα," *read* "ακανστα."
—— 355 — 2 *from bottom, after* "*nílam*," *insert* "*nil mani*, (or *manik*.)"
—— 356 *after* "College of Fort William," *insert* "the word *bahrmani* is also used in the *Khawás-ul* [illegible]*ir*, as a variety of the *yaqút*."
—— 358 — 20 *dele* "or a species of garnet."
—— 358 — 22 *for* "*manik*," *read lálri*."
—— 403 — 5 *from bottom, for* "ΔΙΟΚΛΠ," *read* "ΔΙΟΚΛΗ."
—— 404 — 14 *for* OVA," *read* "OTA."
—— 411 — 8 *for* "Latitude 25° 43′," *read* "Lat. 25° 47′ 26″."

In Table IV. of the Estimate of Life in India, page 284, the first four figures in the second and third column should stand thus:

Age.	Survivors.	Deaths.
20	52221	473
21	51748	489
22	51259	522
23	50737	557

The mistake arose from the calculations having originally been made to commence with the age of nineteen, instead of twenty: and the 5 year averages in Table III. page 283, will all be slightly affected by the same cause. The last figure in the second column, page 284, should be reversed; and in the last column but one, *for* "2080," *read* "2008."

Line 414 line 3 *from below, for* "molluscæ," *read* "mollusca."
—— 444 — 36 *after* "ministry," *insert* "of a man."
—— 445 — 3 *from below, for* "2125," *read* "212.5."
—— 446 — 7 *for* "in bullion," *read* "bullion."
—— 447 — 21 *for* "will be," *read* "would be."
—— — — — *after* "at any," *insert* "rate."
—— 480 — 15-16 *for* "Tariqa-i-Chishíta," *read* "Tariqa-i-Chishtía."
—— 483 — 36 *for* "lost about," *read* "tost about."
—— — — 39 *for* "Mújtahid-i-mústuqill," *read* "Mújtahid-i-mústaqill."
—— 485 — 20 *for* "Taqwiat-ul-Imám," *read* Taqwiat-ul-Imán."
—— 487 — 15 *erase* "5" at beginning of line.
—— 488 — 7 *for* "differences," *read* "difference."
—— 489 — 20 *for* "Káfr," *read* "Kufr."
—— 491 — 23-24 *for* Ishrák f'il Tasarraf," *read* "Ishrák f'il Tasarruf."
—— 492 — 10-11 *for* "the authority or influence of Saints, as respecting intercessors," *read* "respecting the authority or influence of Saints as intercessors."
—— 498 — 23 *for* "Khátim," *read* "Khátima."
—— 501 — 12 *after* "A B C," *insert* "[fig. 5.]"
—— 505 — 20 *for* "5 53 59," *read* "5 52 59."
—— 506 — 11 *for* "5 53 10," *read* "5 53 27."

JOURNAL

OF

THE ASIATIC SOCIETY.

No. 10.—*October*, 1832.

I.—*Analysis of the Vishnu Purána. By* H. H. Wilson, *Sec. As. Soc.*

The *Vishnu Purána*, as may be inferred from its appellation, is eminently *Vaishnava*, and considers VISHN'U one with the Supreme Being, PARAMA BRAHMA, and PARAMA'TMA'.

It is supposed to be related by PARÁSARA, the grandson of VASISHT'HA, to his disciple MAITREYA, and dispenses with the usual machinery of *Suta* and the *Rishis*: it is said in the first chapter, indeed, in the form of a prophetic enunciation by VASISHT'HA, that PARÁSARA is the author of the *Sanhitá* and the *Puránas*.

In other chapters, however, it is again asserted, that DWAIPÁYANA VYÁSA is the author of all the *Puránas*, and to reconcile these two statements recourse is had to a statement in the 3rd chapter of the 3rd section. It is said, that there is a VYÁSA or VEDA VYÁSA in every *Dwápar Yuga* of the *Vaivaswat Manwantara*; of this *Manwantara* we are now in the 28th *Kali:* accordingly, 28 *Dwápar Yugas* have elapsed, and 28 *Veda Vyásas* have existed; the last is KRISHNA DWAIPAYANA, or the person usually designated as VYÁSA. PARÁSARA was the 26th VYÁSA, and this *Purána* is consequently the work of a preceding *Mahá yuga*, or aggregate of four ages. The *Agni Purána* states PARÁSARA to be the author of the *Vishnu Purána*. In the classification adopted by itself, (book 3rd, chapter 6,) it is placed the third; after the *Brahma* and *Padma*.

This *Purána* is divided into six *Ansas*, books or sections, each being sub-divided into a varying number of *Adhyáyas* or chapters: it does not follow the order prescribed by the usual definition of a *Purána*, but deviates less widely than most of these compositions: according to the *Agni Purána*, it contains 25,000 *slokas*. A com-

mentary on this *Purána* exists, but of no great value, except as explanatory of some of the philosophical passages.

The first book opens with the dialogue between Maitreya and Parásara, as already noticed. Parásara states himself to be the son of Sakti, the son of Vasishth'ha. Buchanan, from the *B'hágavat*, makes him the son of Upamanyu and grandson of Sakti, but the *Mahàb'hárat* confirms the authority of the *Purána*. "The son of Sakti (Parásara) next arrived there with his disciples." The passage of the *B'hágavat* on which Buchanan's statement rests, has not been found; the Bengali manuscripts generally read *Saktri* instead of *Sakti*.

Buchanan has also noticed the incompatibility of Parásara's genealogy with his being, as it is stated, cotemporary with Santanù king of *Hastinapur*, that prince being the 44th in descent from Atri, who is cotemporary with Vasishth'ha, who again is but three generations anterior to Parásara; he supposes therefore, that many generations in the line of Vasishth'ha must have been omitted. It is not necessary, however, to attempt to reconcile these incongruities, for the coetaneous existence of Atri and Vasisht'ha is less chronological than mythological, or, perhaps, as they are both enumerated amongst the stars of the great bear, astronomical; it extends throughout the *Manwantara:* their immediate successors, who hold a sacred character, enjoy a like longevity, and are similarly cotemporary at any period with their ancestry and posterity: if we consider them as mere mortals, we must suppose, that Parásara preceded the great war by three generations, Krishna Dwaipáyana, his son, being the father of Dhritaráshtra, Pandu and Vidura by the widow of Vichitravirya. Vyása was however cotemporary with his grandson and their descendants, agreeably to the above system of saintly immortality. Mr. Bentley places Parásara about 575 B. C. (Hindú astronomy), Buchanan about 1300 B. C. (Genealogies of the Hindús), and Wilford 1391 (A. R. ix. 87.)

The first chapters of the first book of the *Vishnu Purána* contain an account of the creation, ascribing it to the association of Vishnu with Pradhána and Purusha, matter and spirit, or the female and male, or passive and active energies. During the intervals of creation, Vishnu exists independant of all connexion or attributes, and is beyond the comprehension of human faculties. When disposed to create the universe, the elements, properties, and senses generated by the two sensible combinations of the deity are collected into an egg floating on the water, in which Vishnu again, as Brahmá, is concealed, and

from which he issues to separate, and arrange the constituent portions of the world: the system is therefore perfectly conformable to that anciently entertained as explained in the opening of MENU, substituting VISHNU for BRAHMA.

The third chapter contains the usual divisions of time, from the twinkling of an eye to the period of a *Kalpa;* the fourth, an account of the *Varáha Avatára*, whence the *Varáha Kalpa*, or actual great period, derives its appellation. In the 5th chapter we have the series of creations, effected by VISHNU, amounting to nine, followed by a more detailed account of the order in which the several classes of beings sprang into existence, extending through the 6th and 7th chapters.

The seventh chapter brings us to the creation of the chief characters of the *Swayambhuva Manwantara*, the account of whose family is in part at least obviously an allegory. *Swayambhuva*, the son of the self-existent, is married to SATARUPÁ, (the hundred or many-formed, the great mother;) their children are two sons, PRIYAVRATA (the lover of devotion), and UTTÁNAPÁDA (where we are at fault), and two daughters, PRASUTI (child-bearing) and AKUTI*, a name not admitting an obvious allegorical etymology. It may be observed, that the *B'hágavat* adds a third daughter, DEVAHUTI (invocation of the gods), married to KERDAMA (soil or sin); AKUTI was married to RUCHI (light), a *Prajapati*, but not included in the usual enumeration of those sons of BRAHMA, unless he be the same with MARICHI; their offspring were YAJNA (sacrifice), and DAKSHINÁ (donation), who, though brother and sister, were married and begot the twelve divinities called *Yámas*, a class whose character and office are not known. PRASUTI was married to the *Prajapati* DAKSHA (ability or power); they had twenty-four daughters, all emblematical, SRADDHÁ, (faith,) LAKSHMI, (prosperity,) DHRITI, (fortitude,) TUSHTI, (content,) PUSHTI, (satiety,) MEDHÁ, (apprehension,) KRIY'A, (action, &c.); thirteen were married to DHERMA, (equity;) of the other eleven nine were married to the nine *Rishis*, SWÁHÁ (oblation) was wedded to fire, and the collective PITRIS or progenitors had *Srádddhá*, the funeral sacrifice, for their spouse: their posterity are all of the same significant character, as their appellations satisfactorily indicate. The *Puránas*, in general, follow this account of the first race of created beings, with some modifications and additions: the *B'hágavat*, as we shall hereafter see, has supplied the most copious accessions, and has introduced into the series

* However another reading often occurs, usually considered, it is true, an error of the copyist, but possibly the right reading; AHU'TI, invocation of the gods, prayer, or sacrifice.

a degree of perplexity and inconsistency that are quite foreign to the simplicity of the *Vishnu Purána*, in which we may therefore conceive the primitive notion is most faithfully represented.

The churning of the ocean for the recovery of *Sri* and *Amrita* or ambrosia, lost to the gods in consequence of the anger of *Durvásas* with *Indra*, is narrated in the ninth chapter, but more concisely than usual. The posterity of the *Rishis* by the daughters of Daksha follow, and we have then a long episode relating to Dhruva, the second son of Uttánapáda, who, for his devotion to Vishnu, was elevated to the dignity of the polar star.

The descendants of Dhruva are traced in the 13th chapter to the 6th Menu Chákshusha, and from him by Uru, Anga, and Vena to Prithu, from whom the earth was named *Príthivi :* the fourth descent from Prithu, consisted of the ten Práchetasas, and their son was Daksha the *Prajápati* in a new birth : this is the father of the 60 daughters, of whom 27 were the constellations, the lunar mansions, or wives of the moon, and thirteen the wives of Kasyapa, by whom the gods and demons, men and animals, were produced. The remaining chapters of this section contain the accounts in detail of the origin of these races, from the daughters of Daksha married to Kasyapa. The original refers these in the 21st chapter to the *Swárochisha Manwantara*, but this is irreconcilable with the descent of Daksha, as before mentioned from *Chákshusha Menu*, and as again stated in the third book. This section of the *Purána* terminates with the division of the universe under its respective regents, and praises of Vishnu as the Supreme Being.

The second book contains the usual account of the division of the earth into *Dwipas*, and the formation of the seven *Pátálas*, and *Naraka*, with the situation and course of the planets and the description of their several cars : that of the sun is very fully and curiously detailed : the last chapters give a legendary account of *Bharata*, the object of which is to inculcate the supremacy of Vishnu, and the unreality of worldly existence, agreeably to the doctrines of the *Vedánta* philosophy.

The third book of the *Vishnu Purána* should have formed, agreeably to the systematic classification of the contents of a *Purána*, its fourth, treating of the reigns of the different *Menus* and their descendants : the detail however is little more than a bare enumeration of names, the appellation of the *Menu*, the Indra, or king of the gods, the *Ganas* or classes of *Devas*, the seven *Rishis*, and the sons of the *Menu*, and who are all distinct in each *Manwantara*. Those of the

first, sixth, and seventh periods are of the most note. In the intermediate ones little of interest occurs, and less in those that are to come. We may therefore here insert the names of the persons of these three *Manwantaras.*

MENU.	*Swayamb'huva.*	*Chákshusha.*	*Vaivaswat.*
INDRA.		*Manojava.*	*Purandhara.*
DEVATAS.		*Adyas.*	*Adityas.*
		Prasutas.	*Vasus.*
		Bhavyas.	*Rudras, &c.*
		Prithugas.	
		Mahanubhavas, &c.	
RISHIS.	*Marichi.*	*Sumedhi.*	*Vasisht'ha.*
	Angiras.	*Viraja.*	*Kasyapa.*
	Atri.	*Havishmat.*	*Atri.*
	Pulastya.	*Uttáma.*	*Jamadagni.*
	Pulaha.	*Madhu.*	*Gautama.*
	Kratu.	*Atenaman.*	*Viswamitra.*
	Vasisht'ha.	*Sahishna.*	*Bharadhwája.*
SONS.	*Priyavrata.*	*Uru.*	*Ikshwáku.*
	Uttanapada.	*Puru.*	*Nab'hága.*
		Satadru.	*Dhrishta.*
		Tapaswi.	*Saryáti.*
		Satyavati.	*Narishyanta.*
		Suchi.	*Bhágadheya.*
		Agnishthoma.	*Karusha.*
		Sadyumna.	*Prishadhra.*
		Abhimanyu.	*Vasumat.*
		Atiratra.	

In this manner the persons of the remaining seven *Manwantaras* are prophetically detailed.

In the next chapter of the third section occurs the enumeration of the 28 *Veda Vyásas* already alluded to. In the *Dwápar* age of every *Mahúyug*, or aggregate of four *Yugas*, a *Muni* or sage appears, who makes a new arrangement of these works, and is therefore called *Vyása* or *Veda Vyása.* The *Vyása* of the present period is KRISHNA DWAIPÁYANA, the son of PARÁSARA, and the twenty-eighth of the series, and who, according to this authority, and the sectarial notions it advocates, is a minor descent or incarnation of VISHNU himself.

The origin of the *Vedas* and *Puránas* is treated of in the next chapter of this section, with many curious details. The *Veda*, it is said, was originally a ritual, containing ample instructions for the five great sacrifices, or oblations to fire, at the full and change of the moon, and in every fourth month, the offering of animals, and libation with the juice of the acid Asclepias; these five being doubled as *Prakriti* and

Vikriti, or simple and modified, became ten, and these were the objects of the *Vedas*.

The mode in which *Vyása* is described as arranging the *Veda*, implies its prior existence in separate portions, as he called to his assistance four persons, severally acquainted with them, or *Paila* for the *Rik*, *Vaisampáyana* for the *Yajur*, *Jaimíni* for the *Sáma*, and *Sumanta* for the *Atharvan*. The description is not very clear, but it should seem that he made a kind of digest of the whole collectively, which he again separated according to the purport of the different passages; the *Rik*, containing the *Richas*, or prayers used with oblations by the *Hotri*, or officiating priest; the *Yajur*, comprising the formulæ of the rite repeated by the *Adhwaryu;* the *Sáma*, composed of the hymns chanted by the *Udgátá;* and the *Atharvan* comprehending prayers and rites suitable for princes or the military order, repeated or conducted by the *Brahmans* on their behalf.

The *Vishnu Purána* then describes the different *Sanhitás*, or collections of the prayers and formulæ of each *Veda*, and their respective authors. The *Rig* was divided into two *Sanhitás*, by Paila, who taught one to Indrapramati and the other to Vashkala; each of these and their disciples made further subdivisions. The *Yajur* was divided into 27 *Sákhás* by Vaisampáyana, besides the other great portion of it obtained from the sun, by Yajnawalkya, which subsequently branched into fifteen divisions. The *Sáma* and *Atharvan* are in a like manner extensively subdivided. The whole of these details are curious, and indicate a period long forgotten, when the *Vedas* were extensively studied: the names derived from the subdivisions, as *Taittiri*, *Vaji*, &c. still designate tribes of *Brahmans* in some parts of India, but few of any of the separate *Sanhitás* are procurable. Mr. Colebrooke has made use of these sections of the *Vishnu Purána* in his account of the *Vedas*. (A. R. Vol. viii.)

The origin of the *Puránas* is here also ascribed indirectly to various individuals. *Vyása* is said to have compiled the *Purána Sanhitá*, but he gave it to Suta or Lomahershana, who had six disciples, Sumati, Agniverchchá, Maitreya, Sinsapáyana, Kasyapa, and Sávarni; and to them Suta delivered six *Sanhitás*. Three of the disciples, Sinsapáyana, Kasyapa, and Sávarni, composed *Sanhitás*, also called *Mula Sanhitá*, and Romahershana compiled another. The *Vishnu Purána*, again, it may be inferred is a subsequent compilation, as it is said to contain the substance of these four works. A list of the *Puránas* is then given as usual, omitting the *Váyu* from the series.

The remainder of the section is occupied with the detail of the duties of the different tribes and orders, and terminates with an absurd legend called the *Yama Gitá*, the scope of which is to shew, that the spirits of those who have faith in Vishnu, are not to be approached by the messengers of the infernal monarch; it must be admitted, however, that compared with the other *Puránas*, the *Vishnu Purána* does not very frequently offend with legendary insipidities of this description.

The fourth section contains the genealogies of the royal families, commencing with the lines of the sun and moon, and terminating with the kings of the *Kalí* age, until a modern period. This section has furnished the greater part of the materials with which Sir William Jones, Mr. Bentley, and Colonel Wilford, attempted to adjust the historical chronology of the *Hindús;* the latter (A. R. Vol. ix.) gives the *Vishnu Purána* as one of his authorities; the first cites a list furnished by his *Pundit*, but it is the same thing with one or two inaccuracies; as an example of these may be stated what he asserts of the four *Kanwa* princes, that they reigned 345 years, whence Sir William Jones observes, that the generations of men and reigns of kings are extended beyond the course of nature even in the present age (A. R. ii. 143.)

Adverting to the same circumstance, Mr. Bentley refers (vol. v. page 324,) the extravagant elongation of the reigns of these princes, to a deliberate attempt to fill up a chasm occasioned by placing the descendants of Janamejaya at too early a period, and cites this as one of the innumerable absurdities of the modern *Hindús*.

Colonel Wilford again observes, these *Kanwas* are said to have reigned 345 years, which is still more extravagant. (Vol. ix. page 110.)

It would scarcely be supposed, that these assertions are all founded on error. In the early stage of Sir William Jones's enquiries, his trusting to his Pandit's authority, may be excused; but it seems very doubtful whether Mr. Bentley or Colonel Wilford took the pains to verify that statement. At any rate, in four manuscripts of the *Vishnu Purána*, two in the *Devanagari* and two in the Bengalee character, instead of 345 years, the term of the united reigns of the four *Kanwa* princes is stated to be 45 years, a period neither extravagant nor absurd, nor beyond the course of nature.

The ancient dynasties of kings anterior to the *Kali* age, within the bounds of which they should no doubt be brought, can scarcely be adjusted with much consistency or satisfaction; at the same time this is a consideration rather favourable to their authenticity, as had they been the result of a systematic fabrication, they would easily have

been adapted to some fixed periods, and to each other. That many inaccuracies and some falsifications have crept into these genealogies may be readily admitted; but there is no good reason to dispute the actual existence of the principal individuals commemorated, nor the general course of their ancestry or descendants. That their memory was preserved by some means anterior to the *Puránas* is established by the *Vishnu Purána*. Reference is made in it repeatedly to former traditions, and old verses are cited as illustrative of the history or character of a number of the princes of whom mention is made. (Sections 8, 10, 11, 12, 13, 19, &c.)

The 11th and following chapters of this book, to the 15th, contain a detailed account of the descendants of YADU. A curious story is interwoven into the portion that relates to KRISHNA, of his being falsely accused of having stolen a marvellous gem, the possession of which secured wealth and prosperity to its possessor, if virtuous. It was given to SATRAJIT, the cotemporary, very inconsistently it must be confessed, of KRISHNA, and his sixth ancestor, and a member of the YÁDAVA family. Apprehending KRISHNA's requiring the gem, SATRAJIT gave it to his brother, who was killed in the forest by a lion. KRISHNA hunting killed the lion and found the jewel; he returned it to SATRAJIT, who gave him in requital his daughter in marriage: this led to further family dissensions, in which KRISHNA was accused by his own brother of having under-handedly appropriated the gem to himself: he, at last, however, cleared himself in an assembly of the *Yádavas*, and the jewel became the undisputed property of his relative AKRURA. In these transactions, the character of KRISHNA, although heightened with marvels, is of a very earthly complexion; and as to BALARÁMA, it is said of him by KRISHNA, that he is unfit to be master of the jewel, because he drinks wine, and is addicted to sensual pleasures. With respect to the gem, its properties of procuring plenty to the country of its possessor, and of bringing down rain when needed, ally it to the marvellous stone, for the acquisition of which, the *Tartar* tribes not unfrequently had recourse to hostilities.

In detailing the lists of *Magad'ha* kings, the *Vishnu Purána* states, that from the birth of PARIKSHIT to the coronation of NANDA, 1015 years elapsed. NANDA preceded CHANDRAGUPTA 100 years, and CHANDRAGUPTA, as identified with SANDROKOPTUS, ascended the throne 315 B. C. PARIKSHIT was the grandson of ARJUNA, consequently the war of the *Maháb'harat* occurred 1430 years before the Christian era. Wilford reduces this by 60 years, and places the conclusion of the

great war 1370 B. C., the difference is not very material, and either date may present an approximation to the truth.

From CHANDRAGUPTA to the accession of the ANDHRA princes, three dynasties occupy an interval of 294 years: the ANDHRAS therefore commenced their rule about 20 years before Christ, which will agree well enough with the account of the power of the Andræ, as given by Pliny, about the end of the first century of our era. According to the *Purána*, there were 30 princes, who reigned 456 years, which brings them to A. D. 436. Colonel Wilford has endeavoured to extend them, however, to the seventh century, identifying the last or *Pulomarshi* with the Pouloumien of the Chinese Annals, who died in 648, according to De Guignes. (As. Res. ix. 87.) If this is correct, the ANDHRA dynasty must be imperfectly given. The commencement being corroborated by Pliny, is apparently accurate, but we want two centuries at the termination. Wilford proposes to supply part of the deficiency, which is less in his statement, by inserting seven princes, whom he calls genuine ANDHRAS, before the ANDHRABHRITYAS; but there is no warrant for this, and the number is inadequate to the interval required. There is however evident confusion here in our authority, the text and comment state expressly that the dynasty is composed of 30 princes, and yet even with the repetition of the name *Satakerni* five times, although it is probably intended in most cases as a title, we have but 27 names. Wilford's list, indeed, contains but 25 names. It is likely, therefore, that some of the names have been lost; and if we can suppose the dynasty to have comprised nearer 40 than 30 princes, we may extend the time of PULIMAN, so as to be the same with that of Pouloumien.

There is another identification in this list with the Chinese history, which may be even more readily adjusted than the preceding. The annals of China record that in 408 ambassadors arrived from Yuegnai, king of *Kiapilí* in India, the *Kapíla* of the *Bauddhas*, to which possibly the authority of the Magadha prince as Lord paramount extended. The name of the prince is clearly YAJNA, and we have a YAJNA SRI the 24th of the ANDHRA kings. Agreebly to the commencement of the race 20 years B. C. and the average of reigns authorised by the text, 15 years and five months, YAJNA SRI reigned about 330, or only 78 years earlier than he appears in the Chinese accounts. If indeed, as is allowable, we consider him to be the 27th prince, being the third before the last, then the agreement is almost precise; as he will have reigned from 375 to 390, and we have only to suppose his reign one of those above the

average amount, to bring him to the year 408; these identifications, however, whether made out precisely or not, bear favourable testimony to the accuracy of the *Hindu* lists, as to the existence of the individuals about the time specified: we can scarcely expect a close concurrence in the annals of different nations, at best imperfectly known to each other.

The succession of races which follows the Andhras is evidently confused and imperfect; seven distinct dynasties are detailed, extending through 1390 years, and two others through a period of 406 years: 47 princes of different tribes succeed them, to whom less than four centuries cannot be ascribed, the whole throwing the last of the Andhras back 2190 years, and computing that 4055 years of the *Kali* age had elapsed: the last periods, grafted probably, as Colonel Wilford has supposed, on the coetaneous existence of different dynasties at undefined intervals, are in all likelihood calculated to fill up the years expired of the *Kali* age, and so furnish a clue to the date of this *Purána:* if 4055 years of *Kali* had passed when the work was compiled, it was written 870 years ago, or in the year 954.

The notices that follow would present an interesting picture of the political distribution of India at the date at which it may be supposed the author wrote, if the passages were less obscure: as it is, considerable uncertainty pervades the description. It appears from it that the *Kshetriya* rule was very generally abolished, and that individuals of various castes, from *Brahmans* to *Pulindas* (mountaineers or foresters) reigned in *Magad'ha* or Behar, at Allahabad, at *Mathurá*, *Kántipurí*, *Kásipuri* or *Kanyapuri*, probably Benares or Kanouj, and in *Anugangam* or *Gangetic* Hindoostan. The *Guptas*, a term indicating a *Sudra* family, reigned over part of *Magad'ha*, and *Devarakshita*, an individual so named, over the maritime provinces of *Kalinga*, &c. the *Guhas* in another part of *Kalinga*, the *Manidhanas* in the *Naimisha*, *Naishada*, and *Kalatoya* countries, or the districts to the east of Benares and Bengal. *Sudras* and cowherds ruled in *Surat*, in *Mewar*, along the *Nermada* and at Ougein; and *Mlechchhas* possessed the country along the *Indus*, along the *Chandrab'hága*, or in the *Punjáb*, *Dárvika*, and *Cashmír:* this last statement is corroborative of the accuracy of the detail, as well as of the date assigned to the composition, as although in the middle of the tenth century, the Ghaznivide princes had not occupied *Cashmír*, yet they had extended their influence along the *Indus*, and into the upper parts of the *Punjáb*.

The fifth book is appropriated to the history of Krishna, and is possibly a graft of more recent date than the original. Although the

story is told in the usual strain, yet there is this peculiarity, that KRISHNA is never considered as one and the same with HARI; he is only an *Ansávatara* or an incarnate portion of VISHNU; not a very distinguished one either, being only one of VISHNU's hairs (B. v. chapter 1.) plucked off by himself at the prayers of the gods, to become incarnate in the conception of *Devaki*, to be born for the purpose of alleviating the distresses of the earth.

The subsequent occurrences are related conformably to the tenor of the *B'hágavat*, and very differently, therefore, from that of the *Bhárat;* the war with JARASANDHA particularly, and the adventures of KÁLA YAVANA: it also includes what may be supposed to typify some hostile struggles between the followers of SIVA and VISHNU, in the personal conflict between KRISHNA, and the former, as taking part respectively with ANIRUDDHA and BANASURA.

From the 34th chapter of this section, we learn that there have been spurious KRISHNAS amongst the *Hindus*, and PAUNDRAKA, the king of Benares, is described as usurping the title of *Vásudeva:* he is encountered by the legitimate possessor of the name, defeated and slain: his son continues the war with the aid of SANKARA or the SAIVAS, and it should appear at first with some success, so as to endanger *Dwáraká*, the capital of KRISHNA: the allies however are repelled, and the holy city *Kasí* burnt by the relentless discus of the victor; the legend seems to delineate, though darkly, actual occurrences.

This book terminates with the destruction of the *Yádavas*; KRISHNA's being shot through mistake by a forester, and his ascent to heaven.

The last book of the *Vishnu Purána*, after describing the divisions of time into *Kalpas*, &c. expatiates on the various pangs that flesh is heir to, and directs mankind to the only remedy for them, faith in VISHNU as the Supreme.

The general character of the *Vishnu Purána* will be readily conceived from this sketch of its contents: it is a sectarial work, but of a much more sober character than such works generally possess, and appropriates to legend and panegyric, a comparatively insignificant portion of its contents: the geographical and astronomical systems to be found in it, are of the usually absurd complexion, but they are more succinctly and perspicuously described than perhaps in any other *Puránas:* the same may be said of the genealogies, and the fourth book, may be regarded as a valuable epitome of the ancient history of the *Hindús*.

The date of the compilation, it has already been observed, may be inferred to be as low as the middle of the tenth century: there are no

other grounds for specifying the date, but the *Purána* is clearly subsequent to the development of the whole body of Hindú literature: the *Vedas* and their divisions are particularised, the names of all the *Puránas* are given as usual, and reference is repeatedly made to the *Itihása* and *Dherma Sástras*. In the fourth section of the third book also PARÁSARA says, Who but NÁRÁYANA can be the author of the *Mahábhárat?* It is consequently posterior to that work, in common it is most probable with all the *Puránas*. Notwithstanding this recent origin, however, the *Vishnu Purána* is a valuable compilation, particularly in its being obviously and avowedly derived from more ancient materials.

II.—*On the Standard Weights of England and India.*

The Westminster Review, No. 31, contains an able article on the imperfections of the system of measures and weights adopted by the legislature in England, upon the report of the parliamentary commission in 1825.

The reviewer justly remarks, that the fear of innovation seems to have curbed the free exercise of judgment by the commissioners, so that in fact, after all their deliberations, they did little more than settle the discrepancies of various standards to the thousandth part of a grain, and lop off four and a half grains from the avoirdupois pound! In most other respects the country is left in as much confusion as before, with two kinds of lineal measure;—two kinds of superficial measure;—three kinds of cubic measure;—and not only two kinds of weight, but these so exquisitely varied, that the larger pound has the smaller ounce!

In lieu of so perplexing and anomalous a state of things, the reviewer proposes to substitute a system founded on a simple and a rational basis: viz.—that some fixed length, a foot for instance, shall be taken as the unit of lineal measure; that the square of this shall become the unit of superficial measure; and the cube, the unit of solid measure. We do not propose at present to advert to his arguments on the inconveniences of our numerous linear and square measures,—but on the subject of weights, we will endeavour to show the kind of system which he represents as capable of formation out of materials at hand, with only such little modifications as would not practically be felt in the ordinary affairs of commerce.

He first premises as a maxim of utility, that the current coin of the country should be closely connected with the weights; accord-

ingly,—the pound of standard silver being coined into 66 shillings in England, it is evident that 11 crown pieces weigh 10 oz. troy, leaving a very simple ratio for the conversion of one into the other: the crown (436.36 grs.) is also nearly equal in weight to the avoirdupois ounce (437½ grs,) and might be substituted for it practically without much inconvenience: moreover, 1000 crowns are exactly equal in weight to a cubic foot of distilled water at the temperature of 15° cent. (59° Fahr.) (436363 grs.)

From these data, it becomes a very easy problem to frame a system of weights, measures, and coin connected together in simple ratios, uniting all the benefits of decimal numeration, and still maintaining tolerable accordance with the weights now in use. To give a general idea of the combination proposed, without entering into its details, we present the following scheme alongside of the existing system.

Proposed Crown Weights.	*Weight in crown grs.*	*Weight in troy grs.*	*Remarks.*
One crown grain, ..	1	0.91	one troy grain = 1.1 crown grain.
20 gr. = 1 scruple,	20	18.18	
3 sc. = 1 dram, ..	60	54.54	
8 dr. = 1 oz. (or cr.)	480	436.36	(the avoir.oz.now is 437.5 tr. gr. or 481.25 cr. gr.)
16 oz. = 1 pound, .	7680	9681.82	(ditto ditto, lbs. 7000 ,, or 7700 ,,)
100 lb. = c. lb.	768000	698182	(the cwt. av. wgs. now 784000 or 862400 ,,)
			tr. gr. cr. gr.
500 lb. = 1 qr. ton,			
2000 lb. = 1 ton, .		13963636	(the ton weighs now 15680000 or 17248000)

Measures of Capacity.

1 oz. = 1 cubic digit (or 0.1^3 foot) = the proposed liquid ounce.
1000 oz. = 1 cubic foot of distilled water, at 59° Farht. or 15° cent.
10 oz. marked x = ½ pint.
20 oz. marked xx = 1 pint.
40 oz. marked xxxx = 1 quart.
160 oz. = ONE GALLON (the present imperial gallon = 10 lb. av. or 10 cr. lb. + 200 c.g)
8000 oz. = 500 lbs. = 1 hogshead = 50 gallons = 8 cubic feet = cube of 2 feet.
1000 lbs. = 1 pipe = 100 gallons = 16 ditto.
2000 lbs. = 1 ton or TUN = 200 gallons = 32 ditto.

It must be confessed, that the higher numbers in this scheme both of liquid and solid weights are too much at variance to obtain easily a footing in commerce, and in many respects as good a system might have been framed with the preservation of one only of the pounds and the present troy grain.

The most fortunate hit in the scheme of the reviewer is in the fortuitous circumstance of 1000 crown pieces, of our preseut coin, counterbalancing precisely a cubic foot of pure water at 59°. A fact worth carrying in the memory, at any rate, for although five shilling pieces are but rarely seen in currency now-a-days, it may be convenient for

those who experimentalize upon water in regard to evaporation, rain, discharge of pipes, and the like, to know that they carry a *decimal divisor* of the *liquid foot* in their pocket. But the crown piece of our coinage is already allied to the pound troy, as the coin must always be by the very provision that the "pound troy shall be coined into so many shillings or aliquot parts." The pound troy then is actually the standard unit of weight and coinage, and however plausible a scheme may be brought forward, unless it adheres to some such fixed point of very general prevalence, it may be looked upon as merely speculative, and not likely to gain admittance among practical men.

The troy pound is coined exactly into sixty-six shillings. The troy ounce therefore weighs 5s. 6d. without any fraction. The weights of every other coin, and the value of all the other systems of weights used in commerce, such as the avoirdupois, the liquid measure, &c. are expressed in terms of the troy grain, which is nothing but a subdivision of the *troy pound unit*, so that although a multiplicity of standards has been made up for preservation and comparison, this alone is entitled to the name of STANDARD. It was to simplify the connection of the avoirdupois weight in relation to the latter that it was changed from 7004½ to 7000 grains; the latter number however is almost as irrational as the former, and it would have been far better to have expunged the anomalous avoirdupois weight altogether; or, if it were thought absolutely necessary to preserve a heavy weight, a *pakka wazn* as the natives of India would call it, it might have been made one-third heavier than the troy pound, or 7680 grs.:— this would have been divisible by 16 into an ounce identical with the troy ounce, and when multiplied by 100, for the *hundred weight*, would have given a weight (of 7680000 grs.) nearly equal to the present clumsy cwt. of 112 av. lbs. or 7840000 grs. and equally applicable to all the wholesale operations of commerce, without necessitating any change of the customs charged on the gross weight, or even affecting the price-current of most commodities in the market.

But it is useless at this time, and at this distance from the scene of its operation, to comment upon a system now irrevocably adopted. It must ever be regretted, that a scheme of such national importance did not chance to fall under review under the ministry so eminent in science as the present Lord Chancellor of England.

The subject was brought to our notice principally by a measure now in agitation before the Government of British India, for the adoption of some law respecting the weights and measures of this country, in which at present so great a confusion prevails that it is almost im-

possible to say what is the recognized standard in either, even at the presidency itself.

The Indian system, when the English first became acquainted with it, combined all the advantages of a direct connection between the coin and the unit of weight*. They were in fact the same thing, until the regulation taking force from the 1st January, 1819, changed the standard purity of the coin by an addition of copper, without altering its value in pure contents of silver. This measure increased the weight of the rupee by an awkward fraction of $\frac{1}{17}\frac{2}{66}\frac{2}{66}\frac{5}{66}$ parts, and rendered all subsequent conversions of weight into money a matter of intricate calculation; for the old rupee was still retained as the unit of weight under the title of *sicca weight*, in contradistinction to the newly introduced *sicca rupee:* and it was allowed still to regulate the weight of the bazar maund, which was forty seer of eighty siccas each.

Subsequent changes in the upper provinces and in the other presidencies have had similar effects of introducing new weights, and although the object aimed at by the home Government has been all along that of equalizing the whole, yet, for want of a common basis to proceed upon, and of due combination in carrying their measures into effect, nothing more has been attained than mere approximations, as perplexing to the admirer of uniformity as the original system itself. It would lead us into lengthy observations to explain the steps taken at each place, to bring about an accordance of the several rupees to that ordered by the Court to be made the standard of India; and as our object is to shew how all may become even now amalgamated into one system, connected directly with the standard of England, it will suffice to state, what our materials are at the present moment:

Appellation.	*Weight in troy grains.*
Calcutta sicca rupee,	191.916 gold mohur, 204.710
——— sicca weight,	179,666
Lucknow rupee, in weight,	172.101 (value in Standard 180.705)
Furukhabad rupee, used as a weight up the country, where the old weight has disappeared,	180.234
Sonat Rupee, (nominal,)	183.644
Madras and Sagur rupee and weight,	180.000 (Madras mohur 180)
Bombay Rupee, in weight, (since ordered to be made 180 as at Madras,)	179.000 but in Standard value 179.642

* The genuine Indian *weights* were the *jo* or barleycorn, the *rati*, *masa*, and *tola:* 7¼ jo = 1 rati: 8 ratis=1 másа=17.708 grs. 12 másа=1 tola=2125 grs. but these are now become obsolete, and are only known to jewellers, or beyond the provinces under British rule.

Bazar maund at Calcutta, ...	82 lbs. 2 oz. 2.055 dr. avoirdupois.
——————— at Benares, ...	82 lbs. 6 oz. 5.9
Salt maund of 82 siccas to the seer, ..	84 lbs. 203. 15.7 drs.
Factory maund, ...	74 lbs. 10 oz. 10.666
Madras candy of 20 maunds, ...	500 lbs. the md. = 24 lbs. 2 oz.
Bombay ditto of 20 ditto, ...	560 lbs. 28 lbs.

The Calcutta or pakka maund is also used at the latter place, and in bullion is received at the Madras and Bombay mints by the pound *troy*, as it is in England : in purchases of native produce, bazar weights are used, which vary in almost every different district : in transactions with the Company's commercial agents, the factory maund is employed ; in salt purchases a maund of 82 siccas to the seer ; opium is sold in packages of 133 to 140 lbs. to suit the Chinese *pikal* weight ; while again for exportation to Europe, English cwts. or lbs. must be entered in the invoice, so that in one merchant's godown there are generally not less than three species of weights, and it is matter of experience, that continual mistakes will occur in their use, unless, as is seldom the case, they are marked in very legible characters, intelligible not only to Europeans, but also to the native weighmen.

It was not long since a case occurred in which the weights of a commercial establishment were found to be in error eight or ten per cent. : it may be very fairly supposed, that this proceeded from the confusion of the weights of different systems, although it must be acknowledged, that a skilful *podar* would very soon perceive differences of such large amount, and if he were inclined to take fraudulent advantage of them, could do so without much risk of discovery. It has been at times source of complaint, that the receipt and delivery weighments at the custom-house are at variance ; in short, if it be desired to clear away all suspicions of wilful or accidental error, and to simplify to the utmost the transactions of commerce, it can only be done by adopting one system of weight ; abolishing all others by common consent, and establishing means of adjustment and verification accessible to all parties.

We shall now offer a few hints on the system which appears most eligible from its simplicity, its connection with existing things, and its ready adjustment to the standard system of Great Britain ; our reason for doing so, through these pages, in the first instance, rather than in a direct appeal to the proper authorities, where we have every reason to know they would meet with proper consideration is, that the question is one of universal interest, and, where the convenience of the public is concerned, the more such a measure is canvassed, the more likely will it be to have its faults and objections pointed out, and improvements, either radical or collateral, suggested.

1. At first view, it is obvious, that the Calcutta sicca *weight*, so called, (179.666 grs.) and the several rupees (or weights) of the upper provinces, and of the Madras and Bombay presidencies, though not identical (varying from 180.7 to 179 grs.) may be made to coincide, without the slightest effect upon commercial proceedings and a number of small perplexing difficulties may thus be avoided.

2. The advantage of assuming in even numbers 180 grains for the sicca weight of all India would be equally obvious in dealings with England, both in coin and in goods; for the bazar maund, being 40 seers of 80 siccas each, would be equal to 576000 grains, or precisely 100 of the standard troy pound of Great Britain. The difference from its present weight would be a little short of ten sicca weight, or two *chitaks*, a quantity far too small to be influential; and if a number of weights were at once adjusted on such a system, they might be dispersed throughout the country, and introduced at once, without disturbing the public mind by any talk of innovation. The seer weight would be exactly equal to $2\frac{1}{2}$ pounds; the pound troy would equal 32 sicca weight; $2\frac{2}{3}$ *British Indian rupees* would weigh 1 oz.; and 1 rupee would weigh $7\frac{1}{2}$ dwt.

With regard to the connection of the maund with the avoirdupois weight, of course a simple relation could not be formed: in practice it would remain nearly *in statu quo*; in theory it will be at any more simply connected than at present in the ratio of $82\frac{2}{7}$ to $82\frac{2}{7}\frac{3}{0}\frac{3}{0}\frac{1}{0}\frac{2}{0}$, or 82 lbs. 2 oz. 2.055 drs.; the maund would represent $82\frac{1}{4}$ lbs. aver. within a trifling fraction.

3. Should it be necessary to retain the Calcutta sicca rupee, which has, at present, by law, the weight of 191.916 grs. troy, this fraction might with great convenience be made at once 192 grs. or exactly $\frac{1}{1}\frac{1}{5}$ in excess of the proposed sicca weight, so that the up-country rupee would be precisely equal to 15 annas, instead of having a small fractional difference as at present. Thirty sicca rupees would then weigh 1 lb. troy, and, if the standard were the same, would be equivalent in value to 66 shillings, the rupee being $= 2\frac{2}{1}\frac{2}{0}$ shillings.

Regarding the difference of standard alluded to, we would fain say a few words, although the subject may prove too technical for general readers to follow. The Indian standard of silver contains $\frac{1}{1}\frac{1}{2}$ of alloy: English standard silver has contained by law ever since the time of William the Conqueror 18 dwts. in the pound, or $\frac{1}{2}\frac{1}{4}\frac{8}{0}$, being $\frac{1}{1}\frac{1}{2}\frac{1}{0}$th *purer* than that of India. Until the last year, however, on account of an error in the ancient Parliamentary standard plates of England,

the coin of both countries has been coined $1\frac{1}{4}$ dwts. too fine, so that in reality our Indian coin has been only $\frac{3}{4}$ dwts. worse, or almost equal to the English legal standard. Now, that the error has been corrected at home, and has been brought to the notice of the proper officers here, with a view to the introduction of a similar correction, would it not be far simpler to equalize the two standards at once by raising our purity $\frac{3}{4}$ dwt., instead of lowering it $1\frac{1}{4}$, and making it differ from almost every coin on the globe? The Spanish, the Portuguese, the Mexican, and the North American dollar; the French franc, the German and Swiss,(since the confederation,) and the Italian coins,all contain $\frac{1}{10}$ alloy,and were it advisable to deviate from the English standard at all, it might be better to adopt that simple and almost universal system: but now that England has determined to supply her colonies with her own currency in silver coin, it may be perhaps better that the rupee of her Indian possessions should conform thereto as nearly as possible,—and if so, the present opportunity of equalizing the standard should not be allowed to pass by. There is another argument in favor of the measure, namely, that the proposed improvement in quality is nearly balanced by the proposed reduction in weight of our up-country rupee from 180.234 to 180.0 grains, so that there would be no appreciable difference in commercial or revenue transactions.

It may be urged against the alterations suggested, that they will render useless the splendid standard weights sent out to the several mints of India, by the Honorable Court of Directors, for the express purpose of adjusting the weights of the country: but such is not the case, for these magnificent standards comprize complete sets of troy weights, avoirdupois weights, and bazar weights, and it is the first of these only which can be regarded as the true standard of comparison whereby the other two are to be verified. The Bazar weights may by means of the troy standards be made to conform to the proposed system with the greater facility, because there will be no fractional discrepancies.

We read some time since in the *Government Gazette*, a notice of the verification of the standards alluded to, which was made by order of the Court upon their arrival in India; it gives a high idea of their great exactitude, and of the superior excellence of the superb balances by which these results were obtained: they were sent out by the Honorable Court in the year 1829, and are deposited in the new mint. Assuming the 1 lb. troy as unit, the errors of the following weights were respectively:

On the single troy grain,..... — 0.0019 grain.
the sixty pound troy, ... — 1.90
the one pound avoirdupois, — 0.04
the fifty-six pound ditto, .. + 0.71
the sicca weight, ... + 0.003
the maund, ... + 0.2

A brief description of the principles of the construction of these balances, and of the improvements introduced by Mr. Bate, was given in the GLEANINGS, vol. iii. p. 220.*

Since the examination above alluded to, the standard measures of capacity have also been verified, and have been found equally creditable to Mr. Bate, their maker. They are brass cylindrical vessels, covered with flat glass discs pierced through the centre with a small aperture, so that the quantity of distilled water contained in them may be ascertained with perfect accuracy: ivory handles are attached to them, to prevent an undue influence on the temperature of the metal from the contact of the hand. With due allowance for the temperature of the water used in the experiments, the trifling errors of capacity, expressed in weight of water, were as follows:

Names of measure.	Weight avoirdupois.	Temperature.	Calculated excess in grs.	Observed excess in grs.	Error of capacity in grs. of water.
	lb. oz.	°			
Gallon, ..	10 0	77.4	95.97	93.4	+ 2.57
Half gallon	5 0	77.3	47.59	47.8	— 0.21
Quart,....	2 8	77.3	23.78	26.3	— 2.52
Pint, ...	1 4	77.2	11.80	8.0	+ 3.80
Half pint,	0 10	77.0	5.80	6.2	— 0.40
Qr. pint, ..	0 5	76.9	2.87	2.7	+ 0.17

The only material error is in the pint measure, where it is equal to 0.015 cub. inch or about three drops; in all the others but the quart the difference is much within what would be caused by a single degree of temperature higher or lower, and consequently within the limits of experimental error. We hope soon to see the liberal intentions of the home government in supplying these splendid instruments of comparison, followed up by a gradual review and reform of the existing multifarious system of weights and measures in their Indian possessions.

* It is recorded in the *Ayeen Akbery*, that the great Akber caused the royal standard weights of his empire to be made of polished agate, from the barley-corn up to the 140 *tank* weight (about 1 lb. troy). His example is worthy of imitation everywhere, but more especially in a country where metals are so liable to injury from damp, and acrid perspiration. The new standard weights, although doubly gilded, already exhibit incipient specks of oxidation.

III.—*Remarks on a late Paper in the Asiatic Journal on the Gypsum of the Himalaya. By the Rev.* R. Everest.

In the July No. of the Asiatic Journal, there is some information given us on the gypsum of the Himalaya, for which the thanks of all lovers of geology are due to the writer (Capt. Cautley). But as it is accompanied by a theory of the formation of gypsum in general, which seems to have been hastily adopted, and which a more mature consideration of the subject would probably induce him to reject, I shall make no apology for pointing out what I believe to be his error, lest others should be misled by his authority.

Having stated a doubt among geologists respecting the gypsum of the Alps, viz. whether it is primitive or transition, he proceeds to describe the gypsum of the Himalaya, and having done so, thus expresses his opinion as to its origin.

" A question of considerable interest arises from the appearance and position of the above-mentioned deposits, which, as mentioned in a former part of this paper from their position under rocks of the primary and secondary classes acquire an *appearance of antiquity*, not borne out by the general history of the mineral; viz. that the gypsum throughout the globe is simply an *infiltration* analogous to the tufa, and calcareous deposits; and depending on causes chemically similar; the sulphuric acid being the active generator instead of the carbonic. *If in the proximity of sulphur an excess of oxygen would produce sulphuric acid, a difficulty is removed, and the contact with lime-rock, or carbonate of lime would, it may be supposed, produce its sulphate or gypsum; and I cannot perceive the improbability of such a process having been, or being still in force;* or that nature's laboratory might not have been as active in the dissemination of gypsum, as it is in the present day, of the calcareous tufa."—vide p. 293. And again, p. 295. " If therefore, where carbonate of lime, sulphur, and water are abundant, the chemical change above mentioned is allowed, or is supposed from analogy, to be a probable consequence, gypsum can no longer be entitled to a place in either primary, transition, or secondary classes; but must be considered as an adventitious formation common to all ages, and produced by causes analogous to the present rapid formation of calcareous tufa. Among our primary and transition rocks, none can be assimilated to the stalactitic carbonate of lime; among our secondary or latest class of general rocks, there is none like the gypsum, that is to say, *we know of none actually forming at this day.* Causes that led to the formations of such abundance of gypsum formerly may, from unassignable reasons, no longer exist; and those which produce the tufaceous carbonates, then at rest, may now be in full vigor."

Did the writer, when he thus proposes as original the opinion of the formation of sulphuric acid from the proximity of sulphur and water, forget that it is the common solution of one of the most common phœnomena in geology, I had almost said, in nature; and never

doubted? In almost every bed of clay, where sulphuret of iron and calcareous matter are present, and the bed is so loose as to allow of infiltration, the sulphuret is decomposing and the sulphate of lime forming? Did he not know that the same solution was commonly given and received for the presence of the abundant sulphuric and sulphurous acids, which both rise in vapours from the craters of volcanos and impregnate the mineral waters near them; viz. that they were produced by the decomposition of sulphur and sulphuretted hydrogen. Has he never heard, for instance, of the phænomena of the "Solfatara" near Vesuvius, and the manner in which they are accounted for? Lastly, when he asserted that "we know of no gypsum actually forming at this day," had he forgotten that gypsum, as well as the tufaceous carbonate, is actually forming at present? In proof of this, I will refer him no further than to a popular treatise of the day, Lyell's Geology, (vol. I.) Under the head gypsum springs, he may see a notice of that at Baden near Vienna; and a little farther back he will find an account of the baths of San Filippo, where three copious springs deposit calcareous carbonate, with gypsum and sulphate of magnesia.

Having accounted for the formation of gypsum, and thus rendered it probable that some gypsum beds are deposited by infiltration, i. e. by the insinuation of the mineral in solution into cracks and fissures, he comes to the general conclusion that all gypsum is produced by infiltration. That gypsum is analogous to calcareous deposits, is certainly true, but if he had recollected the manner in which calcareous deposits took place, he would have seen that great part of them could not be said to be caused by infiltration. Thus, when a spring containing carbonate of lime in solution issues to the surface, most of its mineral is carried to a neighbouring river; by the river to a lake, or to the sea. We have instances of calcareous beds now forming at the bottom of lakes, and, though we can have no direct evidence of what is going on at the bottom of the sea, we have good reason to believe, that the same process is taking place there. Now the same reasoning holds with respect to sulphate of lime. It is carried down to lakes and seas, and must be precipitated, owing to the evaporation which is continually taking place. If we examine the deposits of carbonate of lime and gypsum, which together constitute great part of our later strata, we find that they tally with the above supposition; viz. that they are precisely such as would have been deposited at the bottom of the lakes or shallow seas. The different remains found in them, the shells, the aquatic vegetables, the amphibious reptiles, the fishes, the mammalia, all point to the same result. Take, for instance, the

Paris basin, as it is called. Here we have gypsum interstratified with beds of sand, marl, and carbonate of lime; now what reason have we to suppose that the gypsum was deposited by infiltration any more than the carbonate of lime, or indeed than the sand and marl; for they too may be held in suspension by springs, as the others may be held in solution. Do not the remains found in each prove that they are all of the same era? The writer talks of the absence of vegetable remains in gypsum. Did he never hear of any in the gypsum near Paris? Moreover, if we *must* suppose the process of infiltration to have taken place for the gypsum, and for that alone, we must also suppose that the place it now occupies was once a hollow. That is, in the country round Paris a subterraneous cavity existed, a few feet in depth, but occupying an area of many miles in extent, covered by a roof composed of loose beds of sand and gravel. The writer may have seen, in examining mines, the great difficulty of driving a tunnel through soft strata, wide enough even for a man to creep through, and the artificial supports it must receive. What could have supported the cavity, we just now supposed, before the infiltration was completed? I forbear from extending these arguments to the gypsum of the earlier secondary formations, but they are equally applicable to them. The writer states that all geologists are agreed as to many beds of gypsum being secondary. One would have thought that circumstance might have made him hesitate before propounding his theory, and conclude, they had some good reasons for doing so. As I have never examined the gypsum of the Alps, I cannot enter into that part of the question; there are one or two other points, however, which I cannot pass over, as they seem like a revival of the obsolete doctrines of Werner. The writer esteems it almost matter of certainty, that the origin of all gypsums is contemporaneous, from the "exact resemblance both in texture and crystallization that they all bear, whether Alpine, or those varieties found with the secondary rocks: a similarity that does not exist in any of the limestones formed at different periods." To refer him no further than the same chapter of the same book, I have already quoted (Lyell), we find there that a rock is now depositing in Italy from a spring, "which cannot be distinguished, in hand specimens, either in grain, colour, or composition from statuary marble." I have myself seen on the continent of Europe a secondary limestone, not distinguishable in texture and crystallization from the primitive marbles which are usually found in beds in mica-slate. Many other instances might be cited to the same effect. Nor is the writer more fortunate in two other assertions he has made, viz. that "quartz veins are the type of tran-

sition," and that primary rocks "are never found reposing on the newer formations."

That identity of mineral structure proves formations to be contemporaneous, and that the order of superposition is invariable, were doctrines laid down by Werner, and for a long time received as axioms in geology. But of late years, a further insight into the phænomena of existing volcanos, and a more extended research over the surface of the globe, have brought both these propositions into doubt, and tended to confirm a belief that natural causes at present in operation are adequate to produce all the appearances that are presented to us. I cannot quote an example of quartz veins in secondary rocks from memory, and at this distance in the country having few books to refer to, I must be content with Jamieson's Mineralogy. It is there stated, under the head quartz, that quartz veins are found in secondary rocks as well as in transition. But I could name a locality, in the north of Europe, of granite overlying a transition limestone, and I can refer to Humboldt, as quoted by Daubeny, (on volcanos, p. 350,) for the following as an ascending series: No. 1, granite; 2, Alpine limestone; 3, granite. To the same chapter of the same work I would refer for a description of the porphyry of South America, not distinguishable from the transition porphyry of Europe, which as well as sienite, gradually approximates to trachyte, and passes into it; so that Humboldt considers there is no natural line of separation between the transition and modern volcanic formations of America. What then becomes of the doctrine of contemporaneous origin? It may be matter of convenience to preserve the classification of primary, transition, secondary, and tertiary rocks, for want of a better or as indicative of certain organic remains. But it is prejudicial to the cause of truth to ascribe to the opinion more importance than it deserves; especially in a country as yet almost unstudied, where the disciples of it *must* go forth predetermined to find analogies to the European formations, and to overlook discrepancies.

It may appear presumptuous in me to hazard an opinion respecting a rock which I have never seen, but one or two circumstances mentioned by the writer lead me to believe, that the gypsum beds described by him in the Himalaya are not posterior to the formations with which they are connected. The first of these is, that they are interstratified with a reddish argillaceous schist. Now although it may be conceived to be possible that liquid sulphate of lime might have been forcibly thrust between two layers of rock of a different nature, as we see is frequently the case with lava, trap, and granite; there is nothing in the history of gypsum which leads us to believe it would happen. It

is but rarely found in veins, and never is, I believe, the sole substance that fills a vein. My second reason is, that he describes it as passing into the limestone with which it is connected. Now, it is usually inferred, that rocks in juxta-position, which approximate and gradually pass into each other, are contemporaneous, or at least next in succession to each other. The passage of one into the other at least proves, that the one, if not semi-fluid, was loose, earthy, and unconsolidated, so as to admit of being penetrated by the other, at the time of their junction.

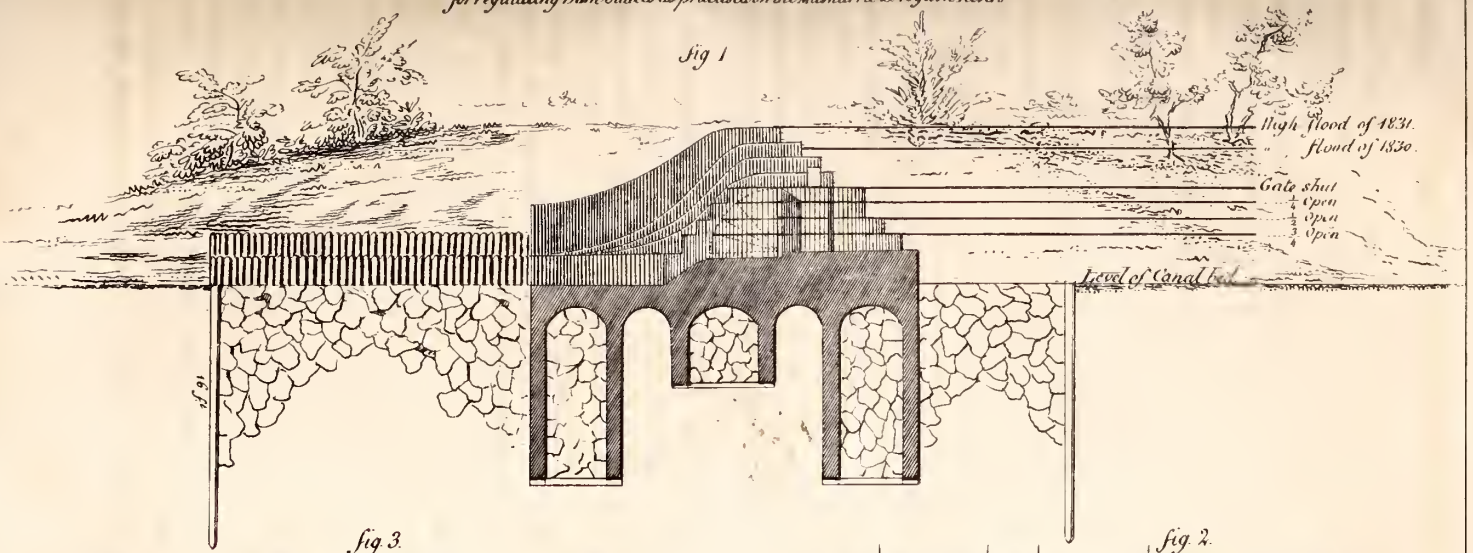
IV.—*Description of the Regulating Dam-Sluices of the Doab Canal.*

To provide a clear and open water-way during floods, unimpeded by the superstructure, which is generally attendant on sluice gates, and to facilitate their removal on sudden freshes, the following construction has been adopted at the dams over the large mountain torrents that cross the Doab canal in the country north of Saháranpúr. Although merely a modification of the old self-regulating gate, it may be perhaps worth noticing, as I am not aware that an arrangement similar in detail has either been put in practice before in works of this nature, or that gates depending on lower pivots for their movements, have ever been alluded to in any books treating of canal works.

It may be necessary to mention, that the mountain torrents which cross the lines of the Doab canal, in their northern extremities, only flow during the rainy months, when continued falls of rain in the lower mountain range, and on the belt of forest that skirts them to the south, give rise to very sudden and rapid drainage, which being effected on the line of these rivers, or as they are provincially termed *rows*, cross the canal at right angles, and pass off by a series of sluice openings, fixed in masonry dams across their channels. On these occasions the volume of water is not more to be guarded against than the quantity of floating logs, large forest trees, roots, grass, &c. that the water collects in its course, for all of which a passage is as absolutely necessary as for the water itself. As the canal supply of water depends entirely on these masonry dams, and the facility of regulating the sluices in them, so that they may remain closed and be opened upon the occurrence of sudden freshes, is of absolute necessity, the main point, to be attended to, is to provide openings sufficiently large for the escape of the greatest quantity of water that the channel will carry, yet of such a size that the opening and shutting of the whole line can be effected in the shortest possible

SKETCH of GATES

for regulating Dam Sluices as practised on the Muskurra & Vyaon Rivers



Calcutta J.B. Tassin lith.

time, and with the least possible labor; at the same time avoiding the application of superstructure in the shape of a fixed road-way and lifting gates; in short, to throw the whole dam as open as possible, and to relieve it from any obstructions that may interfere with the free passage of the floating timber, &c. It will appear evident, that, the best sort of dam in a position of this nature would be a simple flooring of masonry, with flanks of the same material; the bund or bank for retaining the water being constructed of earth, gabions, &c. which although it would be annually washed away during the rains, would be repaired at a trifling expense, and the space of masonry between the flanks would provide an escape sufficiently ample, and at the same time perfectly free and unimpeded by any interruptions from piers, &c. in its width. This species of dam would best suit a situation, where the heavy freshes only rise once during the year, and springs of sufficient abundance occur below the works to keep the southern line of canal supplied with water; but in the present case, the destruction of these bunds or dams, and the loss of the head supply from the mountain streams, would leave the canal nearly dry, as there are but a few scanty springs in the southern limits. To meet this difficulty the following form of sluice has been introduced in the dams over the Rogaon and the Muskára rivers, on the Doab canal works; and as the experience of two rainy seasons has proved its efficacy, and shewn a facility of working, which was in a measure unexpected, I cannot do better than enter into a short description, accompanying it by a sketch, which will also exhibit the high-water mark of the floods that have occurred within the last two seasons.

Fig. 1—Represents a tranverse section through the centre opening of the Muskára dam. The gate being closed, the flank revetment is shewn at the back. The horizontal lines explain the different levels at which the canal supply may be regulated. The two upper lines shew the high-water marks of floods in the rains of 1830 and 1831. The former of 8 feet 9 inches, and the latter of 10 feet, from the flooring of the dam.

Fig. 2—Shews an elevation of three openings of the dam, with the sluice gates at different angles, the windlasses and chains fixed, &c.

Fig. 3—Shews three similar openings, with the gates dropped, and the windlasses, chains, &c. removed, as happens in the height of the rains, when the rivers are subjected to continual floods. The gates moreover act as self-regulators on certain occasions, especially on the approach of the flood water from the hills, which is generally sudden, although its approach is perfectly well known to the inhabitants of this part of the country.

The gates are made to fit the grooves in the masonry as closely as possible, so as not to fall by their own weight, but to depend on the increased pressure of the rise of water for their removal in these sudden floods: the arrangement on these occasions is simple, the catches fixed to the bit-heads are removed from the ratchet wheels

at the end of the windlasses, and the handspikes being removed also, a rise of a few inches in the water throws the whole dam open at once—a method that is usually practised in the cold-weather floods, and when the rise of the water is not very great. In the height of the rains, the logs of wood and rubbish borne in the waters makes this out of the question ; fig. 3 being the state of the sluices at that period.

August 18, 1832, *Northern Doab.* B.

V.—*Note on the Jabalpúr Fossil Bones. By* James Prinsep, *Sec., &c.*

[Read at the Meeting of the Physical Class, 3rd October.]

In consequence of a hint from Dr. Hugh Falconer, that he had heard of the discovery of some fossil bones at Jabalpúr, I inserted a notice in the June number of the Journal, soliciting information on the subject from some of my correspondents on the Nerbadá.

I am happy to say, that my appeal has not been ineffectual, and that the subject has been taken up with zeal by Doctor G. G. Spilsbury, Civil Surgeon at Jabalpúr. That gentleman has sent me by dâk three specimens of the fossil bones for presentation to the Society, promising a further supply when the season shall enable him to visit the spot, and offering to conduct any extended investigations which the Physical Class may point out as desirable to elucidate the subject. Doctor Spilsbury informs me, that the fossil remains were discovered by Captain Sleeman two years ago. They are not mentioned by Capt. Franklin in his survey of that part of the country, printed in the 1st pt. *Trans. Phys. Cl.* neither by Dr. Voysey, nor Captain Coulthard: Captain Sleeman is therefore entitled to the sole credit of having brought the interesting fact to light, and we may hope from his official situation that he will zealously take measures for making a particular examination of the spot, so as to extract if possible some fragments of bone in better preservation, and enable us to ascertain to what animals they belong, and to what epoch of the world's history they may be referred.

Dr. Spilsbury describes the locality as being about 1½ miles N. E. of the residency at Jabalpúr, on the northern side of a broken range of limestone hills, capped with a horizontal layer of trap, rising from the valley of the Nerbadá, about 150 feet to the east of the small rising ground, where the petrified tree was discovered, which is in the museum.

The three specimens sent are in too mutilated a condition to enable us to pronounce what they may be, but the osseous structure of the two first is very apparent.

They differ materially from the fragments of Himalayan fossil bone brought down by Mr. Royle in January, inasmuch as the latter contain-

ed its natural quantity of animal matter unaltered, whereas all of these now before us are thoroughly mineralized,—that is, the whole of the animal substance has in them been replaced by earthy matter, which proves to be of different quality in each; the following are the results of a hasty chemical examination of them.

No. 1.—In this specimen, the osseous part has become quite friable and white, as if it had been burnt, while the membranous fibre has been replaced by crystals of carbonate of lime of a delicate greenish hue: I separated a small portion of these crystals with care, and analysed them by solution in muriatic acid, in a glass measure over mercury: the carbonic acid disengaged was equivalent to 82.5 per cent. of carbonate of lime; the remainder was phosphate, which had adhered to the crystals. The white part treated in a similar way gave,

Carbonate of lime,.	14.0
Phosphate of lime dissolved with ditto and precipitated by ammonia,..	85.5
Needle-form silicious fibres evidently deposited by infiltration, ...	0.5
	100.0

There was no trace of animal matter.

No. 2.—The appearance of this bone is more compact than the first: the membranous texture has in some places taken a fine peuce color, and in others a green tinge: treated as before, or rather calculating the carbonate from the *weight* of gas expelled; and the phosphate from the amount dissolved by the acid, in excess of the carbonate, its composition was,

Carbonate of lime,.....	16.0
Phosphate of lime, ...	71.0
Skeleton of silex more complete than the first; color jasper red, ...	13.0
	100.0

No. 3.—This specimen has become almost entirely silicified; it scratches glass; does not effervesce with acids, and only yields one per cent. to boiling nitric acid: it is unaltered before the blow-pipe.

Before Mr. Royle went home, he gave me a fragment of porous calcareous stone, found by him somewhere on the banks of the Jamna, which he imagined to be fossil bone: I did not then minutely examine it, but I am now happy to confirm his opinion, and only regret, that I have not the locality to pursue the inquiry further: the animal matter of this specimen, No. 4, is gone, and is replaced only by loose dirt: the composition of the osseous part is,

Carbonate of lime,.....	18.0
Phosphate of lime,.....	80.0
Brown ochreous residue,.....	2.0
	100.0

The ammon. precipitate of phosphate was digested in sulphuric acid, and converted into sulphate: the filtered solution was then proved to contain phosphoric acid by its behaviour with muriate of magnesia and ammonia. The analysis was not carried farther than to the demonstration of the presence of he phosphates generally, and their amount in round numbers.

The Ava fossil bones were found to be mineralized also, and to have lost their animal matter, but they differ again from either the Himalayan or the Jabalpúr fossils in regard to the mineralizing substance, and are of two distinct kinds.

4. The first, a dark brown heavy substance, is impregnated with iron clay, yielding on analysis,

Carbonate of lime, ...	25.	
Phosphate of lime dissolved in nitric acid, ...	34.	100.
Silex and oxide of iron, &c.--not dissolved. ..	41.	

5. The second or earthy bone from Ava proved to be wholly converted into carbonate of lime, colored merely with a little clay-iron of a dirty greyish brown.

VI.—*List of Articles of Materia Medica, obtained in the Bazars of the Western and Northern Provinces of India.* By J. F. Royle, *Esq. late Superintendent of the Botanic Garden, Seháranpúr.*

The following table was by no means drawn up with a view to publication; thinking it however eminently fitted to assist naturalists in India in pursuing their investigations of the natural products of the country, we obtained the author's permission to make use of it as it is. In the 11th volume of the Asiatic Researches will be found a catalogue of a similar nature, drawn up by Dr. Fleming and Professor Carey, of such articles of Materia Medica, drugs, minerals, and plants as were procurable in the bazars of Bengal, with notes of the uses and qualities of many of them. The present table contains very numerous articles foreign to that list, and to these provinces altogether; and besides the advantage of the progress of botanical knowledge since that time, the plants of many of the drugs not cognizable by their external appearance have been procured and cultivated by Dr. Royle in the Saháranpúr Garden, to ascertain their real nature, and to compare them with the description given in the works of Aristotle, Dioscorides, Pliny, Avicenna, and the ancient Arabic authors. These remarks relate more particularly to the voluminous catalogue of plants, &c. taken home by Dr. Royle, which we hope ere this has been put into the publisher's hands; but the present epitome of such substances

as were procurable in the open bazars is entitled to the greater confidence, from having been corrected by those more ample tables. Where uncertainty prevails about any article, it has been left in blank to be filled up hereafter with a pen; and we shall take care to advise our readers when we obtain any information for the completion of the list. Meantime, we can but recommend to others to make similar catalogues in Central, Southern, and Eastern India, so as to form an appendix to the one before us.

The alphabetical order followed by Dr. Royle is, it will be seen, that of the Arabic language, because the names in the first column are mostly those which occur in the Arabic medical works. This can be attended with inconvenience only to the very few in India who may be ignorant of the Persian alphabet; whereas, on the other hand, it affords facility in recognizing the native names, and in referring to native works: besides which, those who are acquainted with the oriental name (and such acquaintance is implied in a catalogue giving English synonymes) can more readily seek for it under the Persian initial than under the English, which may vary *ad libitum* according to the system, fancy, or ignorance of the writer.

The numbers in the first column refer to the specimens in Doctor Royle's cabinet: the second column contains the Arabic names: the third gives synonymes, generally Hindústani: the fourth shews the part of the plant sold or used as a drug: then follow the Botanical name and the place whence procured, the latter depends frequently upon the declaration of the venders, and is consequently vague, as in the case of "India," where the particular place cannot be defined. In some instances a locality is given as being *mashhúr*, or noted for supplying a good quality of what may otherwise be common to many other parts of the country;—where "gardens" are mentioned, either the Seháranpúr, or the Calcutta Botanic Garden is intended.

Reference.	Name under which Article is described in Catalogue. *(a)*	Hindustani or other synonyme.	Part used.	Botanical name.	Whence obtained.
1	Aarghís,	Zírishk, *p.*	bark,	Berberis *chitra*,	Hills.
2	Abrún,	(house leek,)	plant,	Labiatæ, n. o.	Delhi.
3	Abúkhalsa,	Ratanjot,	root,	Buglossum?	Múltan.
4	Abukánis,	(sow bread,)	do.	Cyclamen,	Turkey.
5	Abhul,	Húbèr,	fruit,	Juniperus,	Amritsér.
6	Utaruj,	Bijaora nimbu,	peel,	Citrus,	Gardens.
7	*Atís*,	Butís,	root,	Aconitum *atees*,	Hills.
8	Asal,	Pharas,	seed,	Tamarix,	India.
9	*Aslak*,	Sambhálú,	fruit,	Vitex trifolia,	Do.

(a) Indian names in the first column are printed in italics, to distinguish them from the rest, which are Arabic.

Reference.	Name under which Article is described in Catalogue.	Hindustani or other synonyme.	Part used.	Botanical name.	Whence obtained.
10	Ijás,	Alú Bokhara,	fruit,	Prunus Bokhariensis,	Kabul.
11	Ujmúd ?	Ajwain,	seed,	Ligusticum *ujwain* et umbellifera,	diffusum, India. Khadir.
12	Ahríz,	Kusumphúl,	do.	Carthamus tinctorius,	India.
13	Akhírus,	Kal-gihún,	do.	Coix Indica,	Hills and Khadir.
14	Adá, adrak,	(Green ginger),	root,	Zingiber officinalis,	Ind. Hills,
15	Azáraki,	Kouchla,	seed,	Strychnos, nux vomica,	India.
16	Izkhir,	Mirchiagand,(bél,)	root,	Andropogon,	Do.
17	*Anjár,*	Badám kohí,	seed,	Prunus chúlú,	Hills.
18	*Arlú,*	Tah-baranga,	root,	Bignonia Indica,	India.
19	A'as,	Mendi ?	fruit,	Myrtus communis,	Kashmír.
20	Asarún,	Taggar,		substitute for *Asarum Eur.*	Hills.
21	Ustukhudús,	Dharu,	plant,	Prunella (substitute for Lavandula strichos),	Kabúl.
22	Asgandeh,	Nagaorì,	root,	Physalis flexuosa,	India.
23	*Isqíl,* unsul,	Kandrı,	root,	Scilla Indica, (squill,)	Do.
24	Usturkhár,	Unt-katára,	plant,	Fagonia Mysoriensis ? Echinops sphærocephalus,	Delhi. Firth.
25	Ushneh,	Chalchalira,	do.	Lichen Islandicus, L.from hills substituted,	Hills.
26	Aftimún,	Akás-bél,	do.	Cuscuta Europæa,(reflexa, subs.)	Kabúl.
27	Afranjeh,	Aflunjeh,	seed,	Urtica,	Do. and Delhi.
28	Afsantiu,	Satàrú,	do.	Artemisia absinthium,	Kabúl.
			plant,	——— Indica,	Amritsér.
29	Afímídún,		root,		Delhi or Surat.
30	Afius,	Afius *g.*	plant,		Do.
31	Akakia,		ext. fr.	Acacia vera,	Arabia viâ Delhi.
32	*Akás bel,*		plant,	Cuscuta reflexa,	India.
33	Akit makit,	Kal-karenja,	seed,	Cæsalpinia Bonducella,	Do.
34	Akrora,		root,	Cyperaceæ ?	Delhi.
35	Akr-ul-bahr,		wd.and bk.		Púrab.
36	Iklil-ul-jabal, flower-buds of one of the Myrtaceæ (subst. for rosemary)				Surat.
37	Iklil-ul-malek, parang,		fruit,	(leguminosæ,)	Kabúl.
38	Alu saràsún,	(alu sún ?)	plant,		Surat.
39	Amáritun,		do.		Do.
40	Amdaryan,	Amdarban,	berry,		Arabia.
41	*Amár bél,*		do.		Amritsér.
42	*Amras,*		concretion found in old mango-wood,		Delhi.
43	*Amsúkh,*		seed and berry,		Surat.
44	Um-ghilan,	Kekar,	fruit,	Mimosa Arabica,	India.
45	*Amal bèd,*		Acid twigs,		Delhi.
46	Amlaj,	Aonla,	fruit,	Phyllanthus emblica, Emblica myrobalans,	India.
47	Ambaj,	Am,	do.	Mangifera indica,	Do.
48	Amchúr,	unripe,	do.	Dried do.	
49	Anteleh,	Nirbisi,	root.	Caltha *nirbisi,*	Amritsér.
50	AnjibárRumí,	Bistort,	do.		Kabúl.
51	Anjudán,		seed.	Ferula asafœtida,	Arabia.

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52	Anjudán 2nd,		seed,		Surat.
53	Anjnreh,	Utangan,	seed,	Urtica,	Kabúl.
54	——— 2nd,	Nettle seed,	seed,	Urtica,	Marwar.
55	*Andhaúlí*,		wood,		Dehli.
56	Anésún,		seed,	{ applied to Apricon petro-selima,	{ Room. Kabúl.
57	Awáfínús,		seed and plant,		Surat.
58	*Anga*,	Chirchira,	seed,	Achyranthes argentea,	India.
59	Ahlílaj,	Bijwareh,	fruit,	Terminula Chebula,	Do.
60	—— asfar,	Har-zard,	fruit,	Ditto,	Do.
61	—— aswad,	Ditto séah,	fruit,	Ditto,	Do.
62	—— aswad júa,	jawí haré,	fruit,	Ditto,	Do.
63	I'maranútáli,		berry,		Surat viâ Dehli.
64	*Babchí*,		seed,		Púrab.
65	Babúna, *p.*	Chamomile,	flower,	Anthemis *nobilis*,	India.
66	Bad-áward,		berry,	Hedysarum Alhagi?	Surat.
67	Badranjboyeh,	Billé-lotan,	plant,	Ocymum?	Púrab.
68	Badrúj,	Jangla túlsi,	seed,	Ocymum,	Furakhabad.
69	Bádinjan,	Baigan, Egg plant,	do.	Solanum *melangena*,	India.
70	Badyankhatai,	Star-anise,	do.	Ilicium usitatum,	China.
71	Billa-i-kand,		root.		Kabúl.
72	Bardast,	Abnús, ebony,	wood,	Diospyros,	India.
73	Báqila,	Sen-channa, bean,	seed,	Faba vulgaris,	Do.
74	Báqila-misri,		do.	Nelumbium speciosum,	Do.
75	*Balangú*, túkhm,		do.	{ Draconphalum Roylenum,	{ Kanour. Rewarí.
76	*Bansa*,		leaf,	Justicia adhatida,	India.
77	*Bijisar*,		wood,		Dakhan.
78	*Bidarí kund*,	Sarál-chíp,	root,	Hedysarum tuberosum,	Púrab.
79	*Bídhára*,		do.		Gangake Khadir.
80	*Barkak*,		berry,	A scandent plant,	Surat.
81	Barg-Tibet,	Hulas Kashmírí,	root,	Rhododendron campanulatum,	Kashmír.
82	Barm dandí,		plant,	Centaurea,	India.
83	Birin jásif,		berry,	Artemisia,	Najíbabad.
84	Biranj kabulí,	Bae birang,	seed,	Embelia *ribes*,	Do.
85	Baryaleh,	Kharánti,	berry,	Sida cordifolia,	India.
86	Bazr katuna,	Asafghúl,	seed,	Plantago *isafyhola*,	Gardens.
87	Buz ghunj,		galls,	Pistacia vera,	Kabúl.
88	Basbáseh,	Gawantrí, mai,	galls,	Myristica moschata,	Púrab.
89	Bastiaj, khilal-i-mekka,		seed,	—— composita,	Dehli.
90	Basfáij,		root,	Polypodium vulgare,	Kabúl.
91	*Bis khapra*,		do.	Trianthema pentandria,	India.
92	*Bis mar*,		wood,		Dehlí.
93	Battikh Hindi,	Tarbúz,	seed,	Cucurbita citrullus,	India.
94	Baklat-ul-hamka,	Kúlfa, lonia,	do.	Portulacca oleacea,	Do.
95	Baqam,	Patlang,	wood,	Cæsalpinia Sappan,	Do.
96	Bakúmbar,	Kúmbha,	flower,	Carèya arborea,	Do.
97	Baládur,	Bhiláwar,	seed,	Semecarpus anacardium,	Do.

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98	Balsán,	Balm of Gilead tree,	wood,	Balsamodendron Gileadense,	Surat.
99	Bazrul hanj,	Ban ?	seed,	Quercus *ban*,	Do.
100	Balelaj,	Bahera,	fruit,	Terminalia hellerica,	India.
101	Banj,	Ajwain khorasani,	seed,	Hyosciamus niger,	Dehlí.
102	Bandál,		fruit,	Momordica, hep. echinatus,	India.
103	Bundaq,	Fúndak,	seed,	Corylus lacosa,	Hills.
104	Bunduk Hindí,	Ritha, Soap nut,	fruit,	Sapindus detergens ?	Deyra.
105	Banafsaj,	Banafshel,	flower,	Viola serpeus,	Kashmír.
106	Ban Karela,		fruit,	Cucurbitaceæ,	Below hills.
107	Bozidán,		root,		Surat.
108	Boi-mádarán,		fruit,	—— [composition ?]	Delhi, Surat.
109	Boi,		do.	Amaranthus tomarosus,	Delhi.
110	*Bhá-rangí*,		bark,		Almora.
111	*Bhaiphali*,		berry,	(leguminosæ,)	Delhí.
112	——— 2nd,		do.		Do.
113	Bahman, súrkh,		root,		Kahúl.
114	——— suféd,		do.		Surat.
115	Bij-hand,		seed,		Delhí.
116	*Bél*,	Belgírí,	fruit,	Ægle marmelos,	India.
117	*Baengan*,	Jangli kathail,	do.	Solanum,	Dehlí.
118	Besh,		root,		Guzerat.
119	*Bhambel*,	Kasuri *n.*	bark,	Euonymus tingens,	Hills.
120	Padil,	Parúl ?	fruit,	Bignonia suaveolens,	India.
121	Pakhán-hed,		root,	Saxifraga ligulata,	Hills.
122	*Panrí*,		root,		Surat.
123	*Papita*,	(St. Ignatius bean,)	seed,	Strychnos Ignatia,	Púrab.
124	*Patol-pattar*,		extract,		Dehlí.
125	Pars-i-oshan,	moharika,	plant,	Adiantum,	Hills.
126	Pusht-barni,	Chit-kabra,	root,	Hedysarum Alopecuroides,	India.
127	Palás papreh,	Dhak-papra,	seed,	Butea frondosa,	Do.
128	*Paňwár*,		do.	Cassia tora ? obtusifolia,	Do.
129	*Pilaikanda*,		root,		Dehlí.
130	*Phalwa*,			Bassia butyracea,	Almora.
131	*Pokhar múl*,	Baghar mul,	root,		Guzerut.
132	*Palu*, ,	Keril,	fruit,	Capparis aphylla,	Hansí.
133	*Petha*,	Kumra,	seed,	Cucurbita pepo,	India.
134	*Tal-mokhana*,	Isgandhanagori,	do.	Barleria longifolia,	Do.
135	Tirayaman,		root,	Anatis ?	Kahúl.
136	Turbad,	Nasch,	do.	Convolvulus Turpethum,	India.
137	Tashmazaj,	Cháksú,	seed,	Cassia acacalis,	Deyra.
138	Turmis,		do.	Lupinus albus,	Egypt.
139	Tamr,	Chuhara,	fruit,	Phœnix dactylifera,	Arabia.
140	Tamr-Hindi,	Imlí,	seed,	Tamarindus Indica,	India.
141	Tamtirih,	Túng ?	seed,	Rhus parviflorus,	India.
142	Taroi siah,		do.	Luffa,	Do.
143	—— ghia,		do.	——- acutangula,	Do.
144	—— karwí,		do.	——- pentandra,	Do.

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145	Túdri suféd,		seed,	Cheiranthus,	Gardens.
146	——- surkh,		do.	Malva	India.
147	——- zard,		do	——— ?	Kabúl.
148	——- gulgún,		do.	——— ?	Surat.
149	Tej-bal,		wood,	Xanthoxylum aromaticum,	Hills.
150	Tin,	Anjir,	fruit,	Ficus Carica ?	Kabúl.
151	*Tent,*	Keril,	do.	Capparis aphylla,	Kurnal.
152	Samrat-ul-asl,	Chhotí maí,	galls,	of Tamarix dioica,	India.
153	——- ut-tarfá,	Burí maí,	do.	——— Indica,	Do.
154	*Jámphal,*	Safri-ám,	seed,	Psidium pyriferum ?	Surat.
155	Jáwars,	Bájra,	do.	Panicum spicatum,	India.
156	*Jámghás,*		root,	——— polypodium,	Surat.
157	Jadwár,	Nirbisi,	do.	Calthæa, (kyllingia),	Amritsér.
158	Jirjír, Tireh tezak, *p.* Tirmira,		seed,	Moricandia *tira,*	India.
159	——- 2nd kind,		do.		Surat.
160	Jazar,	Gájar,	do.	Daucus Carota,	India.
161	Júlnár,	Gul-anar,	flower,	Punica granatum,	Do.
162	Jal ním,		plant,		Dehli.
163	——— 2nd,		do.		Do.
164	Jintiána,	Pakhán béd,	root,	Gentiana ?	Kabúl.
165	——— 2nd,		do.		Surat.
166	Jawansa,		plant,	Hedysarum Alhagi,	India.
167	Jouz,	Akhrot,	fruit,	Juglans regia,	Hills.
168	Jouz-us-sarv,	Sarú, Saras,	do.	Cupressus sempervirens,	India.
169	Jouz-ul-katát,		do.	Solanum	Arabia.
170	Jouz-ul-kai,	Maënphal,	do.	Posoqueria dumetosa,	India.
171	Jouz-boa,	Jai-phal,	seed,	Myristica moschata,	Púrab.
172	——2nd,	(Nutmeg,)	do.	——— ?	Do.
173	Jouz-rúmi,		fruit,		Surat.
174	—— mâsil,	Dhatúra,	seed,	Datura *metel,*	India.
175	—— aswad,	Kala dhatúra,	do.	——- fatuosa,	Do.
176	Jounchí,		plant,		Dehlí.
177	——— 2nd,		berry,		Do.
178	*Jia pota,*	Putranjiva,	fruit,	Nageia *putranjiva,*	India.
179	*Cháb,*		berry	of gaj-pípal,	Najibabad.
180	*Chándni,*		seed,	[an convolvuli ?]	Dehlí.
181	Chái, cha,	(Tea,)	leaf,	Thea viridis,	China.
182	*Chirya kand,*		root,		Kashmir.
183	Chalápa,	(Jalap,)	do.	Convolvulus *jalapa,*	Dehlí.
184	Chilghoza,	Nuoza,	seed,	Pinus *neoza,*	Amritsér.
185	*Chámpa,*		do.	Michelia Champaca,	Hills.
186	*Chób chini,*		root,	Smilax Chinæ,	Púrab.
187	*Chúk,*		do.		Amritsér.
188	*Chonch,*	Pát,	seed,	Corchorus olitorius,	India.
189	Hásha,		plant,	(given for thyme,)	Surat.
190	Háshish,	Husn-i-yúsf, *p.*	seed,		Marwar.
191	Hab-ul-bán,	Bakain,	fruit,	Melia sempervirens,	Surat.
192	Hab-ul-balsán,	Túkhm balsa,	seed,	Carpobalsamum	Arabia.

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193	Habut-ul-khazrá,	(green seed,)	seed,	Pistacia terebinthus,	Kabúl.
194	Hab-uz-zulam,		do.		Arabia.
195	—— simneh,	Piyal ke bíj, Chiraunjí,	do.	Buchanania latifolia,	Najibabad.
196	—— ghár,	(laurel berries),	fruit,	Laurus nobilis,	Arabia.
197	—— qúlt,	Kulthí,	seed,	Dolichos	Hills.
198	—— Qilkil,	Kúlkúl, Karávi,	do.	Cardiospermum Halicacabum,	India.
199	—— mahlab,	Gyuní,	do.	Rhus ?	Almora.
200	—— níl,	Kaldona,	do.	Spomæa cærulea,	India.
201	Hurf,	Hálim,	do.	Lapidium sativum,	Do.
202	Hurmal,	Isband,	do.	Corchorus capsularis,	Do.
203	Hasak,	Gokrú dakhaní,	do.	Pedalium murex,	Hatras.
204	——	Gokrú,	do.	Tribulus lanuginosus,	India.
205	Huzuz hindí,	Rasot,	extract,	Berberis Asiatica,	Nagarkoth.
206	—— mekkí,		gum,		Surat.
207	Hulbeh,	Methí,	seed,	Trigonella Fœnum-græcum,	India.
208	Halimos,		wood,		Surat.
209	Hammáz barrí,	Epalkí, Chuka,	seed,	Rumex undulatus,	Saháranpúr.
210	Hamáma,	(αμωμον),	leaf,		Surat.
211	Ditto,	Ditto,	do.		Kabúl.
212	Himmas abíaz,	Chana Kabulí,	seed,	Cicer—,	India.
213	Himmas ahmar,	Lal chana,	do.	Cicer arietenum,	Do.
214	Hinná,	Mehndí,	leaf,	Lawsonia inermis,	Do.
215	Hénteh,	Gehún,	seed,	Triticum hybernum, æstivum,	Do.
216	Hanzal,	Bislambha,	root,seed,	Cucumis colocynthis,	Do.
217	Khúb-bazí,	Chandera,	fruit,	Malva rotundifolia,	Saháranpúr.
218	Khúbeh,	Khúbkalán,	seed,	Sinapis pusilla ?	Marwar.
219	Khardal,	Raí,	do.	Sinapis nigra ?	India.
220	Khurnúb,	(*Carobs* fruit),	fruit,	Ceratonia siliqua,	Syria.
221	——Shamí, ——Nabatí,		do.	Cassia	Arabia.
222	Khiroa,	Arandí, Réndí,	seed,	Ricinus communis,	Farkhabad.
223	Khas,	Kahú,	do.	Lactuca sativa,	India.
224	*Khas*,	Panní, Bena,	root,	Andropogon muricatum,	Do.
225	Khas-khásh-abíaz,	Post,	seed,	Papaver somniferum,	Do.
226	—— aswad,	Pazára,	do.	Ditto, red variety,	Do.
227	Khusyat-us-sálab,	Salab-misrí,	root,	[Orchideæ,]	Kabúl.
228	———	——	do.	variety,	Saháranpúr.
229	———	——	do.	———,	Púrab.
230	Khitmí,	Gúlkhyrú,	seed,	Althæa rosea,	India, Gardens.
231	Khiláf,	Bed múshk,	do.	Salix Ægyptiaca,	Kashmir.
232	Khandrus Mekkí,	Bari joar,	do.	Zea *mays*,	India.
233	Kholinján,	Kolinjar,	root,	Alpinia Galanga,	Púrab.
234	Khiár-shambar,	Amaltás,	fruit,	Cassia fistula,	India.
235	*Khaeri*,	Todri saféd,	seed,	Cheiranthus *cheiri*,	Kabúl.
236	Dar chiní,		berry,	Laurus cinnamomum,	Púrab.
237	Dar shishaan,	Kaiphul,	do.	Myrica sapida,	Hills.
238	Dar fílfil,	Pipal,	fruit,	Piper longum,	India.
239	*Dalim*,	Darmí, Dhármi, Anár,	seed,	Punica granatum,	Hills.

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240	Dar hald,	Ambí haldi,	root,	Berberis Asiatica,	Hills.
241	Dánaj abrúj,		seed,		Súrat.
242	Dukhn,	Chína, Kangní,	do.	Panicum miliaceum,	India.
243	Dardáb,	Kachri, send,	fruit,	Cucumi,	Do.
244	Daránaj-Arabi,	Atis?	root,	Doronicum pardalanthes,	Arabia.
245	Dam-ul-akhwain,	(post).	bark,	(gum?)	Surat.
246	Dand,	Jamál gota,	seed,	Croton tiglium,	Púrab.
247	*Dopaharya,*		do.	Pentapetes Phœnicea,	India.
248	*Dúdhi,*		plant,	Euphorbia hirta,	Do.
249	——— 2nd,		do.	Euphorbia,	Delhí
250	——— ki jar,		root,	Euph. hirtæ radix,	India.
251	*Dhai,*		flower,	Grislea tomentosa,	Do.
252	*Dhanattar,*	Asphota?	seed,	Clitoria ternatea,	Do.
253	Deodar,		wood,	Pinus Deodara,	Hills.
254	Zareh,	Jawár,	seed,	Sorghum vulgare,	India.
255	Raziánaj,	Souf,	do.	(substitute given,)	Do.
256	Rásan,		leaf,	Salvadora *jal,*	Shamlí.
257	*Rámpatri,*		rind,		Dakhan.
258	Ráwand,		root,	Rheum Emodi,	Hills.
259	—— khatri,	Ráwand chíní,	do.	——— palmatum,	China.
260	*Ratanjot,*		plant,	Lithospermum vestitum,	Delhi.
261	——— 2nd,		do.	[Vorragineæ,]	Do.
262	Ríwásan,	Jael,	seed,	Æschynomene *sesban,*	India.
263	Rumán,	Anár,		Pomegranate fruit seed,	
264	Zabíb múnaqqa,	Kismis,	fruit,	Vitis vinifera, (raisins,)	Kabúl.
265	—— ul-jabal,		seed,	Delphinium ?	Surat.
266	Zaráwand tawíl,	Isarmúl,	root,	Aristolochia longa,	Kashmír.
267	——— múdehraj,		do.	——— rotunda,	Do.
268	Zarnab,	Birhmi,	leaf,	Taxus variatus,	Hills.
269	Zaranbád,	Kachúr,	root,	Curcuma *zeranbel?*	Do.
270	Zafrán,	Kesar, (saffron,)	stigma,	Crocus Cashmerianum,	Kashmír.
271	Zanjabil,	Sonth,	root,	Zingiber officinalis,	Hills.
272	Zúfá-yábis,		plant,	(given for hyssop,)	Kabúl.
273	Sáj,	Sagwán,	seed & l.	Tectona grandis,	India.
274	Sádaj Hindí,	Tez-pát,	leaf,	Laurus cassia,	Hills.
275	Sál,	Sál,	do.	Shorea robusta,	Deyradún.
276	Sálsa, (úshbeh)	(salsaparilla)	root,		Surat.
277	*Ságú dana,*	(sago)	plant,		Calcutta.
278	*Sáng,*		fruit,	Mimosa	Hansi.
279	Sifistán,	Laisora,	do.	Cordia myxa,	India.
280	Satáwar,	Satráwal,	root,	Asparagus ascendens,	Najibabad.
281	——— safed,		do.		Delhí.
282	*Satpúra,*	Burans,	bark,	Rhododendron arboreum,	foot of Hills.
283	*Sati,*	Kapúr-kachar,	root,	Globba *ordhnoul,*	Deyra.
284	Sazáb,	Sadás,	seed, br.	Ruta graveolens,	Surat.
285	—— kohí,		do.	—— parviflora?	Hills.
286	Sadá soházin,		seed, fr.	Hibiscus Phœniceus?	Delhi.
287	Sadei,		plant,	—— composita,	India.
288	*Sarphonka,*		do.	Galega	Do.

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289	Sarshaf,	Sarson,	seed,	Sinapis dichotoma,	India.
290	*Sarwári*,	Chúa,	seed,	Celosia argentea,	India.
291	Säd,	Motha,	root,	Cyperus rotundus?	Guzerat.
292	——- 2nd,	———	do.	——— ditto,	Delhi.
293	Safarjal, (hab)	Bihí-dana,	seed,	Pyrus cydonia,	Kashmír.
294	Silq,	Chokandar,	do.	Beta vulgaris,	Gardens.
295	Salikheh,	Taj,	bark,	Laurus cassia,	Najibabad.
296	Súmmáq, H.	Kangní,	seed,	Panicum Italicum,	India.
297	———		do.	Rhus *toony*,	Hills.
298	——— (v. Arzan)		do.	Rhus coriaria,	Kabúl.
299	Simsim, semam,	Til,	do.	Sesamum orientale,	India.
300	Semúndar phal,		fruit,	Barringtonia acutangula,	Do.
301	—— sokh,		seed,		Khadír.
302	*Samar kokla*,		galls,		Púrab.
303	*San*,	Mesta pát,	fruit,	Hibiscus cannabinus,	India.
304	Sana,		leaf,	Cassia senna,	Agra.
305	Sumbul-ut-tib,	Jatamansi,	root,	Valeriana *jatamansi*,	Hills.
306	*Sans-rút*,		plant,	Portulacca,	Delhi.
307	*Sankhahúli*,		do.	Evolvulus,	India.
308	*Singhára*,		seed,	Trapa bispinosa,	Do.
309	Súranján shírín,		root,	Colchicum *autumnale*,	Surat.
310	——— talkh,		do.		Kabúl.
311	Sús,	Múl-hatí,	do.	Glycyrrhiza globa,	Multán.
312	Rab-us-sús,		extract,	Liquorice,	Arabia.
313	———— 2nd,		do.	————	Kabúl.
314	Sosan,	I'rsa,	root,	Iris,	Do.
315	*Sahajna*,		seed,	Hyperanthera morunga,	India.
316	Sisáliyun,		do.	Sesali?	Surat.
317	Shákhul,	Arhar,	do.	Cytisus cajan,	India.
318	——— 2nd,	Tor,	do.	——— bicolor,	Do.
319	Sháneh dushtí,	Kanghí,	fruit,	Sida indica populifolia,	Do.
320	Sháh balút,		seed,	substitute for Acorus,	Hills.
321	Sháh taraj,	Pil papra,	plant,	Fumaria parviflora,	India.
322	Shah hasfar,	Ryhán, Tulsi,	seed,	Ocymum *pilosum?*	Jungles.
323	Shabit,	Soya,	do.	Anethum *soya*,	India cult.
324	Shabibí,	Urad ke jar,	root,	Phaseolus max. radiatus,	Surat.
325	Shabbú,		seed,	(not the seed of Polyanthus),	Delhí.
326	Shabú nah,	Arlú,	do.	Bignonia Indica,	India.
327	Sharbatí,		do.	Ocymum	Lucknow.
328	*Sharífa*,		do.	Annona squamosa,	India.
329	Shaqáqal,		root,	Eryngium campestra?	Kabúl.
330	Shuksá,	Bádáward, *p.*	bark,	Cratagus oxyacantha, a substitute given,	Surat.
331	*Shukakai*,		fruit,	Cassia?	Purab.
332	——— 2nd,		do.	Mimosa,	Dakhan.
333	Shakar-i-tighál,		manna,	found on Anzerút,	Kabúl.
334	Shaljam,	Salgram,	seed,	Brassica rapa,	India.

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335	Shoukhrán,		plant,	Conium maculatum, substitute given,	Surat.
336	Shonghan,		plant,	Valeriana,	Hills.
337	Shouniz,	Kalounjí,	seed,	Nigella Indica,	Paniput.
338	Shír-khisht,		manna,	Frascinus ———,	Kabúl.
339	Shitaraj,	Chita,	root,	Plumbago zeylanica,	India.
340	Sibr,	Elwa,	extract,	Aloe perfoliata,	Guzerat.
341	Sátar,		leaf,	Origanum vulgare,	Persia.
342	—— 2nd,			——— Smyrnæum,	Arabia.
343	Sanúbar saghár,		seed,	Pinus neoza,	Amritsér.
344	Sandal abiaz,	S. sufeid,	wood,	Santalum album, Syrium myrtifolium,	Dakhan.
345	—— ahmar,	Rakat-chandan,	do.	Pterocarpus santalinus,	Púrab.
346	Tálisfar,		leaf,	Rhododend. aromaticum,	Kabúl.
347	Tarásis,		root,		Surat.
348	Tarfá,	Jhao,	berry,	Tamarix Indica,	India.
349	Akarkarha,	Karkara,	root,	Anthemis Pyrethrum,	Calcutta.
350	Adas,	Masúr,	seed,	Ervum hirsutum,	India.
351	Arúk,	Jáwa haldí,	root,	Curcuma	Bengal.
352	Arúk-ul-safr,	Amba haldí,	do.	———	Do.
353	———,	Paharí haldí,	do.	———	Hills.
354	———,	Púrabi do,	do.	———	Bengal.
355	———,	Magla do,	do.	———	Do.
356	Ushbeh,	Maghrabia,	berry,	Smilax,	Arabia.
357	Ushshar,	Ak. madar,	root,	Asclepias gigantea,	India.
358	Afs,	Majú,	galls,	Quercus infectoria,	Púrab.
359	Enab,		fruit,	Zizyphus ———,	Kashmír.
360	Enab-ul-sálab,	Bhambholan,	do.	Solanum nigrum,	Najibabad.
361	U'd,	Ud Hindi,	wood,	Aloexylon Agallochum,	Hatras.
362	—— 2nd,		do.		Surat.
363	—— kimarí,		do.		China.
364	Gharíqún,		plant,	Boletus igniarius,	Kabúl.
365	Ghárís,		do.		Surat.
366	Gul-ghárís,		flower,	Delphinium,	Do.
367	———		do.	Eupatorium canna binum,	Arabia.
368	Ghubaera,	Sanjad, *p.*	fruit,	Glinus lotoides, Zizyphus *giom*,	Surat.
369	*Ghotaghia*,	Osareh rewand,	extract,	Stalagmitis Gambogia,	Do.
370	Fághereh,		seed,	Xanthoxylum, Fagara piperata,	Najibabad.
371	Fáwánia,		root,	Pæonia corallina,	Arabia.
372	Fujl,	Múli,	seed,	Rappanus sativus,	India.
373	Farásiún,		do.	Manulea?	Surat.
374	——— 2nd,		berry,	Anthericum Indicum,	India.
375	Faranj mishk,		seed,	Ocymum	Arabia.
376	——— 2nd,		do.	———	Bazar.
377	Faranj,	Mushk Ramtulsi,	leaf,		Kabúl

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378	Fustuk,	Pista,	seed,	Pistacia vera,	Kabúl.
379	——— post birun-i-pista,		envelopes of seed, do.		Do.
380	——— gul pista,	Phul pista ka,	galls,	Excrescences formed by insects.	
381	Fatrasalión,		seed,	Apium petroselinum,	Kabúl.
382	Filfil abiaz,	White pepper,	fruit,	Piper nigrum,	Dakhan.
383	—— aswad,	Seah mirch,	do.	Ditto,	Do.
384	—— moyeh,	Pipala múl,	root,	Piper longum,	Púrab.
385	Fodnaj barrí,		plant,	Dracocephalum Royleanum,	Delhi.
386	Fúfal,	Súpyarí,	seed,	Arecha catechu,	Púrab.
387	——— 2nd,	S. chikní,	do.		Dakhan.
388	—— gul fufal,		gum,	apparently an exudation on Areca catechu,	Púrab.
389	Fúveh,	Manjítb,	root,	Rubia manjistha,	Amritsér.
390	Qaqilleh saghár,	Choti elachi,	fruit,	Elettaria cardamomum,	Malabar.
391	——— kebár,	Barí do.	do.	Amomum racemosum,	Púrab.
392	Qissáh,	Kakrí,	seed,	Cucumis utilissimus,	India.
393	Qasad,	Khira,	do.	——— sativus,	Do.
394	Qirdmána,		do.	Umbellifera,	Kabúl.
395	——— 2nd,		do.	Ditto,	Surat.
396	Qirásia,	Alu balu,	fruit,	Prunus cerasus,	Kabúl.
397	Qarsána,	Shoka ibrahim,			
398	Qurä,	Kadú,	seed,	Lagenaria vulgaris,	India.
399	Qirfeh,		bark,	Lauras *Cassia?*	Furukabad.
400	Qaranful,	Laoung,	flower,	Caryophyllus arom.	Púrab.
401	Qúst shirín,	Kuth,	wood,	Costus,	Amritsér.
402	——— 2nd,		do.		Kashmir.
403	—— talkh,		do.		Amritsér.
404	Qasb-ul-zarireh,	Cheretta,	plant,	Swertia cheretta,	Dakhan.
405	Qutun, (bab-ul)	Binola, cotton,	seed,	Gossipium herbaceum,	India.
406	Qúlan,	Columba,	root,		Surat.
407	Qinnab,	Bhang,	plant,	Cannabis sativa,	India.
408	Qanbil,	Kambela, Strigose pubescence of fruit,		Rottlera tinctoria,	Deyra Dun.
409	Qanturyún,		plant,	Polycarpon arymbosum,	Kabúl.
410	*Kát,*	Katha,	extract,	Mimosa catechu,	Deyra Dun.
411	*Kajuphal,*		seed,	Anacardium occidentale,	Dakhan.
412	*Kakrásingí,*		galls,	excrescence, Rhus,	Hills.
413	Káknaj,		fruit,	Atropa pbysalodes,	Kabúl.
414	*Kála bichwa,*		root,	[polypodi?]	Lucknow.
415	*Kala kúth,*		do.	Calthœa?	Amritsér.
416	*Káli zirí,*		seed,	Serratula anthelmintica,	Hills.
417	Kámráj,		berry,		Purab.
418	Kabábeh,	Kabáb chiní,	fruit,	Piper cubeba,	Palí, Calcutta.
419	Kábbar,		bark,	Capparis spinosa,	Kabúl.
420	Katán,	Alsí Tisí,	seed,	Linum usitatissimum,	India.
421	*Katai-búzung,*	Kathaela,	fruit,	Solanum Indicum,	Do.
422	——— *khurd,*	Kathasla,	do.	——— Jacquini,	Do.
423	*Katol,*		root,		Delhí.
424	*Kathel,*	Kental,	seed,	Artocarpus integrifolia,	Gardens.

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425	Kuras,		seed,	Allium porrum,	Delhí.
426	Karafs,		do.	Opium graveolens,	Room.
427	Karafs bekh,		root,	Ditto,	Kabúl.
428	*Kirm daneh,*		gum,	Lac,	Bokhara.
429	*Kirmali,*		seed,		Delhí (hills).
430	Kurúvia,	Carraway,	do.	Carum Carui, (substitute from Kabúl,)	Europe.
431	Kura,		berry,	Echites	Kheribass.
432	Karú,		root,	Gentiana	Hills.
433	—— 2nd,		do.	Pæderota	Do.
434	Kúzbureh,	Dhanya,	seed,	Coriandrum sativum,	India.
435	*Kissar ke jar,*		root,	Ancissus ?	Saháranpúr.
436	*Kasoundha,*		leaf,	Cassia Sophona,	India.
437	*Kaserú,*		root,	Cyperus tuberosus,	Delhí.
438	Kasht bar kasht,	Maror phali,	fruit,	Helicteres ?	Kherí.
439	*Kishangona,*		plant,	Cyperus	Delhí.
440	Kashús,	Akás bel ke bíj,	seed,	Cuscuta	Kabúl.
441	*Kahora,*		root,	Momordica muricata,	India.
442	—— *Ban kakora,*		do.	The former bears fruit, the latter not,	Do.
443	*Kalesar,*		fruit,	Cucurbitaceæ,	Delhí.
444	Kamázriús,		leaf,	Teucrium chamadrys,	Surat.
445	Kamún,	Zíra siah,	seed,	Cuminum Cyminum,	Kashmir.
446	——— safeid,	—— safeid,	do.	[umbelliferæ,]	
447	Kundus,	Nak-chinkhni,	plant,	Artemisia sternutatoria,	India.
448	——— 2nd,		root,	An Kuth ?	Hills.
449	*Kankol,*	Langoth,	fruit,		Delhí.
450	*Kankol mirch,*		do.		Dakhan.
451	*Kanoucha,* [v. marv,]	Kaoneh,	seed,	Dolichos pruriens,	India.
452	*Khatú,*		plant,	Justicia	Delhi.
453	*Khirni,*		seed,	Mimusops kauki,	India.
454	*Kaelh,*	Kath-bél,	fruit,	Feronia elephanta,	Do.
455	*Gaj pipal,*		do.	Pothos scandens,	Hills.
456	*Gangeran,*		bark,	Grewia hirsuta,	Kherí, Delhí.
457	*Gagán dhúl,*		plant,	[fungi,]	Dooab.
458	*Gul-machkan*		flower,	Pterospermum ?	Hills.
459	*Giloh,*		berry,	Menispermum cordatum,	India.
460	—— Sath giloh,		fecula of	ditto,	Do.
461	*Gihunle,*		seed,		Amritsér.
462	*Gudachla,*		plant,		Delhí.
463	*Ghumohi* safeid,		seed,	Abrus precatorius,	India.
464	—— surkh,		do.	Do.	Do.
465	*Gilar patri,*	Goitre leaf,	leaf,		
466	*Latori,*		plant,		
467	Lihyat-ut-tés,		extract,	an Cytus Hyporistus,	Delhí.
468	Lesán-us-saur,	Gao zaban,	root,		Do.
469	————	Sankaholi,	plant,	Onosma bractiata,	Kabúl.
470	Lesán-ul-saur,	(gul,)	flower,	Borragineæ,	Ghilan.

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471	Lisán-ul-haml,	Bártang,	seed,		Kabúl.
472	—— al-asáfir,	indarjao shírin,	do.	Echites antidysenterica,	Púrab.
473	Luffá,		root,	Atropa mandragora,	Surat.
474	Lakmana,	Lakmaní,	plant,		Delhí.
475	Lodh,		bark,	Symplocos racemosa,	Hills.
476	Louz-hulúv,	Badám shírin,	seed,	Amygdalus communis dulcis,	Kabúl.
477	—— mur,	Badam karwa,	do.	—— amara,	Do.
478	Mazareyún,				
479	Mál-kangní,		do.	Celastrus nutans,	India.
480	Mámísa,				
481	Mámírán,	(2nd kind),	root,	Ranunculus Ficara,	Kashmír.
482	*Manas rohani,*		leaf,	Myrsine bifaria,	Hills.
483	Máhú-daneh,				
484	Máhí zaharaj,				
485	*Mirchai,*	Kawa thonthí,	seed,	Ipomœa	India.
486	*Mirch kal,*		fruit,	Capsicum pubescens,	Do.
487	Marzan-jush,				
488	Marv,	Kanouncha,	seed,	Hippophae salicifolia,	Kabúl.
489	*Mar-hari,*	Maror phali,	fruit,	Helicteres scabra,	Khera.
490	Mishk-tará-mashíh,		wood,	Dictamnus fraxinella,	Baghdad.
491	Moghás,	Maeda lakrí,	seed,	Tetranthes,	Kabúl.
492	——— 2nd,				
493	*Makhareh,*		seed,	Euryale ferox,	Patna.
494	*Malim,*		r. and br.		Hills.
495	*Mor-pankhí,*		plant,	Pteris palmata,	Delhí.
496	*Musli* safed,		root,		Dakhan.
497	—— 2nd,		do.		Gualior.
498	—— safed,	Sembhal ki musli,	do.	Bombax heptaphyllum,	India.
499	—— seah,		do.	Commelina scapiflora,	Kheri.
500	*Múndi,*		plant,	Sphæranthus Indicus,	India.
501	*Maeda lakrí,*	Chandan,	bark,	Tetranthera spitala,	Almora.
502	Nárjil,	Naryel,	seed,	Cocos nucifera,	Bengal.
503	—— bahri,	Daryai naryel,	do.		Surat.
504	Nár-mushk,	Nag kesar,	flower,	Manna?	Guzerat.
505	Nán khwáh,	Ajwain,	seed,	Ligusticum *ajwain,*	India.
506	Nah,		plant,	[rubaceæ],	Delhi.
507	*Nirgandhí,*		root,		Dakhan.
508	*Nirmali,*		seed,	Strychnos potatorum,	Do.
509	*Nigand,-bábarí,*		plant,		Delhí.
510	Nimb,	Nim,	seed,	Melia azadirachta,	India.
511	Nil,	Nil,	do.	Indigofera tinctoria,	Do.
512	*Nil-kanthi,*		plant,	Ajuga	Delhí.
513	Nylofar,	Bhambhúl,	flower,	Nymphæa	India.
514	Waj,	Bach,	root,	Acorus Calamus,	Khorasán.
515	Ward,	Guláb,	fruit,	Rosa damascena,	India.
516	*Halha jorí,*		plant,	Polypodium,	Lucknow.
517	*Húlhúl,*		seed,		
518	Halyún,		fruit,	Asparagus officinalis,	Surat.

Resins, Gums, and Gum-resins.

	Arabic name.	Synonymes.	Botanical name of plant.	
1	Ushaq,	Kándar, Ammoniacum ushk, from	Heraclea gummifera,	Kabúl.
2	Anjír ki gond,			
3	Anzerút,	Sarcocoll,	Pinea sarcocolla,	Do.
4	Bárzad, gauda beroza,	Galbanum,	Bubon Galbaniferum,	Hills.
5	*Padam ki gond,*		Prunus *puddum*,	S. B. G.
6	*Pachdhára do.*		Euphorbia angularis,	Do.
7	Taranj bin, Persian manna,		Alhagí Maurorum,	Kabúl.
8	*Tun ki gond,*		Cedrela Toona,	India.
9	———			
10	Jawashir, gaoshir *p.*	Gum opopanax,	Pastinaca opopanax,	Arabia.
11	*Jingan ki gond,* Kani gond,		Icica gummifera,	Kherí pass.
12	Dam-ul-akhwain, Hira dukhí, Khún kharábá, Dragon's blood,		Dracæna draco, Calamus rotang, Pterocarpus draco,	Surat. Arabia.
13	Rátiánaj,	Rajina, Colophony?	Burseria paniculata,	Surat.
14	Zard álu kí gond,		Prunus *chooloo*,	S. B. G.
15	Zift,	Resin, pitch,		Room.
16	*Saleh ki gond,*	Kundan?	Boswellia serrata,	Kheru.
17	Sakmúnya,	Scammony,	Convolvulus scammonia,	Surat.
18	——— 2nd,			Do.
19	Sakbínaj,	Kandal Sagapenum,	Ferula persica,	Arabia.
20	Sandrús,	Chandrús, Sandarach,		Marwar.
21	——— 2nd,	Kharwa, Copal,		
22	*Sahajné ki gond,*		Hyperanthera morunga,	India.
23	*Siris ki gond,*		Mimosa serissa,	Do.
24	*Sem ki gond,*	Gota gond,	Bauhinia gummifera,	Dehra.
25	Sembal ki gond,	Mochrus,	Bombax heptaphyllum,	India.
26	Sibr,	Elwa, musabba,	Aloe perfoliata,	
27	Samgh Arabi,	Gum Arabic,	Acacia vera,	Arabia.
28	Elk-ul-bútm,	Chian turpentine,	Pistacia Terebinthus,	Surat.
29	Farfiyún, afarbiyún,	Euphorbium,	Euphorbia officinarum,	Arabia.
30	*Karch,*	Nál,	Shorea robusta,	Khera.
31	Kirásia,	Cherry gum,	Prunus cerasus,	Surat.
32	Katira, Kasira, Katila,	Gum tragacanth,	Bombax gossypium,	Kherí.
33	Kundur,	Lobán, Olibanum,		Surat.
34	——— 2nd,	Frankincense,	Juniperus Lycia,	Púrab.
35	*Kaeni gond,*			
36	*Kamarkas,*	Dhawe ki gond,	Butea frondosa,	India.
37	*Khaer ki gond,*		Mimosa catechu,	Deyra.
38	Kah ruba,	Amber,		Hills.
39	Ládan, lázan,	Labdanum,	Cistus ladaniferens,	Surat.
40	Lúk,	Lák, Láh, Gum Lac,	Coccus lacca,	Seharúnpúr.
41	Múr,	Bol, Myrrh,		Surat.
42	Mustaká,	Mastich,	Pistacia lentucus,	Kabúl.
43	Moql,	Gogal,	Bdellium,	
44	——— 2nd,	——— 2nd,		Hills.
45	Nágauri gond,			Nagore.

VII.—*Proceedings of the Asiatic Society—Physical Class.*

Wednesday Evening, 3rd October, 1832.

Sir Edward Ryan, President, in the Chair.

The proceedings of last Meeting were read and adopted.

Library.

The following books were presented:

"Fragmens de Geologie et de Climatologie Asiatiques, par A. De Humboldt," in 2 volumes. *From the Author.*

"An English Index of Indian Plants, by H. Piddington, Esq. Foreign Sec. Agricultural Society, Calcutta, 1832." *From the Author.*

This very useful compendium has been drawn up with great industry from all the available sources of information. The native synonymes include many corruptions from the right reading, which have found their way into Botanical works: it might perhaps have been an improvement that the correct word should have been distinguished from the rest, and spelt according to some constant system of orthography.

Museum.

The Secretary announced the receipt of the fossil shells of the Paris basin, of the tertiary formations of Italy and Sicily, as well as from Diablerets in Switzerland, and specimens of the bone brescia of Nice, alluded to at the last Meeting, in a letter from Dr. Turnbull Christie, of Madras.

The shells are in the highest preservation, and will form a most useful series for reference on all occasions. A catalogue will be published in the Society's Journal, that members at a distance may be aware what fossil shells are in our possession.

A letter was read from Mr. James Calder, Vice-President, presenting in the name of C. Telfair, Esq. President of the Mauritius Natural History Society, the following geological specimens and minerals:

1. *Mammellated black oxide of Manganese*, found in a state of great purity, and in vast quantities, in the interior of Madagascar.
2. *Capilliform Obsidian*, (Actynolite?) from Bourbon. After the last eruption of the volcano in that island, the country for miles round was found to be covered with crystals of green actynolite, like a hoar-frost, which from its appearance received the name of Neptune's hair.
3. *Petrified wood and fossil shells*, from Basse's Straits and New Holland.

   Unfortunately the labels on these are lost, which is the more to be regretted, as the shells and their matrix resemble very closely those from the Himalaya: especially two, which are identical with Nos. 22 and 25 (Producta and Spirifer?) of Mr. Everest's Plate, in the Trans. Phys. Cl. 2nd Part.
4. *Asbestus;* veins in serpentine—locality not specified.

A letter was read from Dr. G. G. Spilsbury, dated Jabalpúr, 7th September, presenting three specimens of the fossil bones recently discovered in that neighbourhood.

The Secretary read a note upon the subject, which appears in the present number.

A geological notice was submitted, explanatory of a series of specimens collected between the plains of Assam and Chíra Punjí, in the Kasya Mountains, and presented to the Society by W. Cracroft, Esq. through the President.

Two boxes, containing 415 specimens of different kinds of wood, from India, Assam, Ava, Arracan, the Cape of Good Hope, Australia, and Pitcairn's Island, with a catalogue describing their native and Botanical names, was presented by Captain Baker, Superintendent of Iron Suspension Bridges.

Captain Baker has just completed an elaborate series of experiments on the strength and elasticity of these woods, of which a partial account was printed in the GLEANINGS. The paper will appear in the RESEARCHES.

A model of Theodore Jones and Co.'s new Patent Suspension Wheels, with a full description of their various advantages, was presented by Lieut. Col. Watson.

Of this invention, we shall give a particular account in our next.

Papers read.

1. Note on the Saline Deposits near Cawnpúr. By Mr. H. H. Spry.

This paper will appear in our next.

2. On the Ice Manufactory at Huglí. By Dr. Wise.

3. Report on the present state of the Boring in Fort William. By Dr. Strong.

The holidays had for a period suspended proceedings, and the overseer was employed in making up a claw and spring tool for the extraction of the rods, which had again unfortunately broken in the second shaft, at a depth of 130 feet. This accident had frequently occurred from the falling in of the sand, notwithstanding the protection afforded by the tubing of the present shaft. It would, probably, be necessary to withdraw the tubes to get hold of the rod; in which case, Dr. Strong proposed to replace them carefully, and proceed with the perforation: but, for this a further supply of cash would be requisite; the last grant of 500 being expended, and money being still due to the workmen.

A motion by Dr. Strong, seconded by Mr. D. Ross, that 500 rupees should be granted unconditionally for the continuation of the experiment, was negatived: an amendment was proposed by Mr. Wilson, and carried, "that the Committee recommend to the Society to make a further grant of 500 rupees to the gentlemen in charge of the Boring experiment, on the express condition, that it shall be the last, unless they shall be then able to shew convincing proof, that its further prosecution will be attended with success."

4. Report of the Sub-Committee, on the subject of the proposed extension of the Museum.

The report pointed out the difficulty of furnishing suitable accommodation for a resident curator on the premises, and proposed instead, that a small house in the immediate neighbourhood should be hired, in which all the preparations of the specimens could be made, leaving the whole of the lower floor of the Society's premises open for their reception. The expence of this arrangement, including the contingents of making and altering cabinets, stuffing, &c. was estimated at 200 rupees per mensem. After some discussion, the report was referred back to the Sub-Committee, to inquire what means exist to meet such an expenditure, before going before the Society with the proposition.

VIII.—*Notices in Natural History. By Lieut.* T. Hutton, 37*th N. I.*

The commencement of the rainy season is the period of vital activity among the insect creation: their rapid and prolific increase presents some of the most astonishing facts among the wonders of nature; it seems as if every avenue of comfort and health would be choked up and destroyed by the millions which crowd into existence; but means are wisely ordained to preserve each link of the chain of nature in equilibrium with the rest: thus beasts prey upon beasts, birds on birds and on insects, and these upon other species, so that the various tribes of living beings are kept within the limits which the purposes of their creation require. I will adduce a few instances of this amazing increase which have just fallen under my view.

1. *Ova of the Spider.*

A lad, whom I employ to bring specimens for my museum, brought me a small white ball, about the size of a pea, which proved to be the silky bag with which some spiders envelope their ova. It was closely constructed of silky threads, strongly interwoven, and glazed on the exterior, for the purpose probably of guarding against moisture. At first sight, its contents appeared to be small white eggs, but on closer inspection, I found them to be young spiders seemingly fully formed, at least as far as I could determine with a tolerable magnifier.—I then took a needle, and drew them forth one by one to the surprising number of *three hundred* and *ten* living spiders.

What numbers of insects must be destroyed to furnish this vast increase with food, while they themselves will in turn fall a prey to birds, &c. before the period of ovipositing shall again arrive; and immense as the increase from one pair of spiders appears, yet having aided in keeping other families within their proper limits, perhaps not one in a hundred will survive to perpetuate the race.

2. *The Scorpion.*

The second instance I shall notice was a scorpion—*Scorpio Afer?* Pecten with 15 teeth; eyes 8; colour dark bottle-green; legs and poison sack dirty straw-colour; clasps or forceps tuberculated—length 3¾ inches.

The above was dug out of a hole in the ground; it had ten young ones clinging about it; these were a quarter of an inch long, and perfectly white, very soft, and the sting not perceptible through a magnifier, although the poison sack was formed—the point, where the sting should be, being quite obtuse in the whole of the young ones.

3. *Fresh-water Crab.*

The third and last instance which I shall at present advert to, was a fresh-water crab, which I found in a small hole, apparently that of a mouse, at the foot of a tree, and which for the present I have referred to the genus *Thelphusa*, Lat.

This had the two exterior antennæ placed at the base of the ocular peduncles; jaw feet covering the mouth; legs 8; forceps of equal size nearly, with a spine on the second joint; shell cordiform, and truncated posteriorly, slightly wrinkled on the side with a short spine anteriorly, near the eyes; colour greenish or livid grey above, dirty white beneath; a mark in form of an impressed ✕ on the back, and two rows of small white spots placed in parallel lines at the anterior part of the shell, viz. two spots in the first line and four in the second, thus ⁎*⁎⁎*⁎. On lifting the ventral plate, if I may so term it, in which the ova are found, I count-

ed to my astonishment no less than *eighty-five* young ones, all alive, and seemingly fully formed; they were pale-greyish above and white beneath.

On placing them in a basin of water, they appeared very lively, swimming about quite briskly, but the next morning I found them all dead; probably in consequence of their not being sufficiently matured to leave the parent*.

From the situation in which I found this specimen, I was at first induced to think that it belonged to the land crabs (*Gecarcinus*), from which it does not much differ, if at all; but some few days afterwards finding another in every respect similar, in a small jhîl, I referred them to the genus above mentioned.

Although I have frequently seen crabs carrying their ova, I never before met with one which had young ones clinging to it; and as several works which I have consulted, state that the ova are deposited in the water, I am still inclined to think that I have not referred my specimens to their proper genus: moreover, the circumstance of the second specimen having been found in the water does not at all militate against the supposition of its being a land crab, as they are said to repair to the water for the purpose of ovipositing.

Stark, in his Elements of Natural History, speaking of land crabs, observes, "They pass the greater part of their lives under ground, coming out in the even-"ing for food. Once a year in the breeding season, they assemble in numerous "troops, and take the shortest direction to the sea, for the purpose of depositing "their ova; and when this object is accomplished, return again to their haunts. "It is said they stop up their holes at the period of their changing their shell."

I shall now conclude my letter with a sketch of an insect, which by Shaw is stated to be a native of Surinam, in South America; and as I had the good fortune to procure a very fine specimen a few evenings since at this station, I feel happy in being able to communicate the same to you, in case it may not hitherto have been acknowledged as an inhabitant of the East.

Order HEMIPTERA, genus NEPA, Water Scorpion, *Nepa grandis*. Snout inflected; wings four, cross complicate, coriaceous on the upper parts.

Fore feet cheliform; the rest formed for walking.

Colour dull brown, darkest on the scutellum and thorax; on the last of which are two pale longitudinal lines—Length 3½ inches.

This species is aquatic, and preys on water insects and tadpoles. I was dining with a friend whose house stands on the bank of the Ganges, when I captured the above.

These insects leave the water and fly during the night, and its coming into the house was probably from the attraction of the lights.

The genus *Nepa* of Shaw, in which he includes the present species, are all inhabitants of stagnant waters; I have collected, besides the *Nepa grandis*, several of the *N. cinerea*, *N. cimicoides*, and *N. lineuris*, being all that Shaw mentioned in his General Zoology.

I may perhaps take occasion to mention some other genera in a future letter, as I have made a very tolerable collection of insects since the commencement of the rainy season.

I shall also take an early opportunity of noticing several varieties of scorpion, which, if the number of teeth in the pectinated plates on the abdomen is to be

* Size of the young ones about as big as a capsicum seed; the old one the size of a dollar.

taken as a distinguishing mark, will amount to many more species than I have hitherto found described in any author I have been able to consult.

I had intended sending a drawing of the *Nepa grandis*, but not being able to delineate it myself with sufficient accuracy, I have been obliged to delay it, until I can get it drawn correctly.

IX.—*Miscellaneous Intelligence.*

1. *Roman Coins in Upper India.*

In a letter published in the *India Gazette* of the 19th October, Dr. R. Tytler mentions that many of the *Diocletian* coins noticed in the catalogue of the Society's Cabinet were presented by himself, and that they were collected at *Allahabad*, *Mirzapúr*, and *Bindáchal*. His inference is, that they were brought to India by Christian emigrants, during the ten years' persecution which occurred in the reign of that Emperor, and that some of the doctrines of the Christian religion were then engrafted upon the superstitions of Hindústán. The coins of *Carinus* and *Numerianus* were from *Mirzapúr* and *Chunar*: and another of *Diocletian's* was procured at Kanouj. If diligent inquiry be made in that part of India, probably an extensive collection of coins of the third century may be made. More remains of the sort will naturally be discovered in the neighbourhood of ancient towns, and the most prevalent date of the coin will in some way prove the period at which these cities were in the most flourishing condition. P.

2. *Spontaneous Combustion of Coal.*

On Friday, the 26th instant, smoke was observed to issue from the hold of the *London*, one of the ships severely handled in the late storm, which on examination was found to proceed from 300 tons of coals then on board that vessel. Means were taken to discharge the cargo, and the river engines were kept at work for two days and nights, pumping water in to swamp the ignited mass: the only damage sustained was in one of the pillars of the lower deck, which was nearly burned through. A portion of the coal was examined by Mr. Ross, of the Mint, and found to contain a considerable portion of pyrites: this mineral by the action of water and air is rapidly converted into sulphate of iron, and developes sufficient heat, when the mass is large, to ignite the coal: frequent accidents of the same nature have before happened. The steamer Emulous on sailing from England was forced to put back on account of the ignition of the coal stores. H. M. Ship Ajax is supposed also to have been destroyed in the same way. Commanders of vessels should take particular care that coals taken on board are quite dry, and shew no yellow veins or nodules: and they should not be placed where they are liable to be wetted, nor too near the powder magazine.

3. *Transit of Mercury observed in England.*

The 5th of May proved in England, as in India, a cloudy day. The planet was seen only thrice on the sun's disc by Mr. Barker of Deptford, and then only for intervals of two or three seconds: the spectacle therefore, as that observer writes in the Literary Gazette, was more gratifying than satisfactory in a scientific point of view. At 9h. 1m. A. M. Mercury was seen advanced about half his diameter on the disc. 9h. 3m. was observed to be the period of the first internal contact; but it is not mentioned whether the chronometer employed was at mean solar, or apparent time.

4. *Rain at Chira Púnji, from 1st September to 8th October, 1832, registered by* W. Cracroft, *Esq.*

	inches.		inches.		
1	1.195	16	0.305	1	0.000
2	1.117	17	1.050	2	0.000
3	1.575	18	6.375	3	0 000
4	2.510	19	1.850	4	0.000
5	4 680	20	0.130	5	0.125
6	1.689	21	0 760	6	0.000
7	0.000	22	0.985	7	3.015
8	not meas.	23	4.600	8	12.650
9	4.232	24	5.010	Rain in Sept.	55 309
10	9.494	25	0.000	In 2 days of Oct.	15 790
11	6.332	26	0.000	Already regt.	154.690
12	0.000	27	0.000	in four months,	225.789 in.
13	0.085	28	1.235	Maximum temperature,	
14	0.000	29	0.000	16th....81° 5′	
15	0.000	30	0.000	Minimum, 29th....60	

5. *Electric Spark from the Magnet.*

The modes in which Sig. Nobili, in Italy, Mr. Faraday, and Mr. Ritchie, in London, and Mr. Forbes in Edinburgh, have successively arrived at this satisfactory result of their researches, are now given to the world.

Signor Nobili was the earliest in point of date, but he was led to the discovery of the spark entirely by the theoretical views and previous experiments of Mr. Faraday, who also arrived at the same conclusion immediately after, and without a knowledge of his rival's labours. The apparatus necessary to display the phenomenon is exceedingly simple. The following are the views upon which it is framed.

"The voltaic pile gives a spark only when composed of a certain number of pairs of plates. A single Wollaston's voltaic element yields it; and when of a certain activity, produces it constantly at the surface of the mercury, to which the conjoining wires destined to close the circuit are conducted. In the voltaic pile, having a certain degree of *electric tension*, the sparks pass between the zinc and copper poles, either in the case of opening or of closing the circuit. In a single Wollaston's element, the tension is feeble and the spark occurs only when the circuit is interrupted. At that moment, the current, which was before moving, accumulates as it were at the place of interruption, and acquires the intensity necessary to cause the spark. Such tension is wanting in the other case of closing the circuit, and the spark also is absent.

"The currents developed in the electro-dynamic spirals by virtue of magnetism are also in motion, but circulate only for the moment during which they are approaching to or receding from the magnet.

"It was, therefore, Sig. Nobili and Antiniori concluded, in one of those two moments that the circuit ought to be opened in making the experiment for the spark."

Experiment. A coil of wire is wound round the cross-bar or armour of a horse-shoe magnet; the ends of the wire are brought away to a short distance from the bar, and bent so as to meet; and, to ensure their contact, a disc is attached to the extremity of one wire, upon which the point of the other impinges at right angles: the contact is then made perfect by amalgamation with mercury. When the bar is separated from the magnet or brought to it, the jerk at contact separates the points of the wire for an instant, and a *spark* is seen to pass from one to the other, and when the armour is suddenly removed it is again visible: the experiment may be repeated at pleasure.—*Phil. Mag.* lxvi. 406.

Meteorological Register, kept at the Surveyor General's Office, Calcutta, for the Month of October, 1832.

Days of the Month.	Minimum Temperature observed at sunrise.					Maximum Pressure observed at 9h. 50m.					Max. Temp. and Dryness observed 2h. 40m.					Minimum Pressure observed at 4h. 0m.					Observations made at sunset.					Observations at 10 P. M.					Rain Gauge, No. 1.	Rain Gauge, No. 2.
	Barometer reduced to 32°.	Temper. of the air.	Depres. of M.B.Ther.	Wind.	Aspect of the sky.	Barom. red. to 32°.	Temper. of the air.	Depres. of M.B.Ther.	Wind.	Aspect of the sky.	Barom. red. to 32°.	Temper. of the air.	Depres. of M.B.Ther.	Wind.	Aspect of the sky.	Barom. red. to 32°.	Temper. of the air.	Depres. of M.B.Ther.	Wind.	Aspect of the sky.	Barom. red. to 32°.	Temper. of the air.	Depres. of M.B.Ther.	Wind.	Aspect of the sky.	Barom. red. to 32°.	Temper. of the air.	Depres. of M.B.Ther.	Wind.	Aspect of the sky.		
1	29,807	79,	1,8	n.	cu.	,864	88,	8,1	n.	cu.	,740	92,	12,8	n.	cu.	,722	85,7	7,2	n.	cu.	,728	85,5	7,3	n.	cl.	,834	85,4	7,9	cm.	cl.		
2	,799	78,5	1,3	n. w.	do.	,840	85,	5,1	n. w.	do.	,723	91,	13,5	n. w.	do.	,712	90,3	11,8	n. w.	do.	,714	84,	4,8	cm.	do.	,816	85,5	8,0	do.	do.		
3	,779	80,	2,1	do.	cl.	,851	86,	6,1	do.	do.	,735	91,3	9,8	n.	do.	,725	90,3	9,6	n. e.	cl.	,731	85,3	4,6	do.	do.	,831	82,3	3,2	s. w.	do.		
4	,816	78,5	1,	cm.	cu.	,860	88,	8,5	n. e.	do.	,726	91,3	12,8	n. e.	do.	,734	86,	7,5	do.	cu.	,737	83,	4,8	n. e.	cu.	,852	82,4	6,2	e.	do.		
5	,812	78,	1,8	n. e.	do.	,861	85,5	7,6	do.	ci.	,733	89,5	10,6	do.	do.	,763	77,3	1,6	s. e.	rn.	,765	76,	1,3	s. e.	rn.	,816	79,2	4,0	do.	rn.		
6	,758	76,	1,8	do.	rn.	,823	76,3	1,8	do.	rn.	,692	74,5	1,	do.	rn.	,688	74,7	1,8	n. e.	do.	,664	74,5	1,	n. e.	do.	,687	75,5	1,9	E.	gale	1,71	1,44
7	,561	77,1	2,1	E.	do.	,522	77,1	2,8	E.	do.	,254	80,0	4,0	SW.	do.	,201	80,0	3,5	S.	do.	,320	79,2	3,0	SW.		,535	75,0	0,8	SW.	do.	3,54	2,74
8	,665	74,	1,8	s. w.	do.	,755	78,5	3,8	n. w.	cu.	,697	84,7	6,5	do.	cu.	,696	84,5	6,	do.	ci.	,699	79,5	1,6	cm.	cl.	,798	78,2	3,8	cm.	cl.	1,65	0,80
9	,747	74,	0,8	s. e.	cl.	,795	82,3	4,8	s. e.	do.	,699	87,	9,1	do.	cl.	,697	87,3	8,6	s.	cl.	,705	84,	4,8	s.	do.	,760	79,2	2,0	s. w.	do.		
10	,711	78,5	1,	s. w.	do.	,790	83,5	5,8	s. w.	cl.	,693	91,	11,8	do.	ci.	,691	90,5	11,6	do.	do.	,698	86,5	6,5	cm.	do.	,778	81,2	2,2	w.	cis.		
11	,748	78,	1,2	do.	do.	,826	83,7	7,	do.	do.	,734	91,7	13,	do.	cl.	,733	90,5	13,6	s. w.	do.	,737	86,	8,5	do.	do.	,852	81,0	4,2	cm.	cl.		
12	,855	73,5	1,6	cm.	do	,926	82,3	10,2	n. w.	do.	,825	91,	15,5	n. w.	do.	,825	90,	14,1	n. w.	do.	,839	83,	5,6	do.	do.	,896	79,1	8,7	s. w.	do.		
13	,884	73,	1,3	s.	do.	,952	83,	7,5	s. w.	do.	,855	89,	13,5	s. w.	do.	,844	87,3	12,3	w.	do.	,840	83,	7,5	do.	do.	,876	79,0	5,2	do.	do.		
14	,870	73,5	0,8	cm.	do.	,930	85,5	11,3	do.	do.	,848	89,	12,8	do.	do.	,823	88,3	12,4	s. w.	do.	,841	82,5	6,8	do.	do.	,895	80,2	6,2	s.	do.		
15	,879	73,	1,3	do.	do.	,956	84,	7,8	n. e.	do.	,855	87,8	13,9	n. e.	cu.	,853	87,3	13,6	n.	do.	,859	83,	6,8	do.	do.	,952	79,8	7,1	cm.	do.		
16	,930	71,7	1,2	do.	do.	,968	83,7	9,	n.	do.	,863	87,	14,3	do.	cl.	,857	86,	13,3	do.	ci.	,855	80,5	7,	do.	do.	,909	79,2	7,0	do.	do.		
17	,893	71,5	1,3	do.	do.	,959	82,7	11,	n. e.	do.	,856	87,	13,	n.	cu.	,849	85,5	11,6	do.	cl.	,849	82,	8,3	do.	do.	,917	78,2	4,9	do.	do.		
18	,857	71,7	1,	do.	do.	,917	82,5	8,3	n. w.	do.	,816	87,7	11,5	n. w.	cl.	,816	85,	10,8	n. w.	do.	,829	82,5	7,5	n.	do.	,891	78,2	5,4	n. e.	do.		
19	,853	72,5	2,8	n. w.	do.	,899	81,7	8,9	do.	ci.	,800	86,7	10,5	do.	ci.	,795	85,8	10,1	do.	ci.	,809	82,3	7,1	cm.	cis.	,867	79,5	5,8	do.	cis.		
20	,833	74,7	3,	n. e.	cis.	,900	80,7	6,	n. e.	cis.	,798	85,	7,3	n.	cis.	,792	83,5	12,6	cm.	cis.	,793	81,5	4,3	do.	do.	,869	80,0	5,0	do.	str.		
21	,837	75,7	1,8	do.	rn.	,916	74,3	1,6	do.	cy.	,845	75,3	1,8	n. e.	rn.	,828	75,	1,8	n. e.	rn.	,828	74,5	1,3	do.	rn.	,879	75,0	2,0	e.	rn.		
22	,857	76,	2,3	cm.	cis.	,906	79,3	4,1	do.	cu.	,784	82,8	6,1	do.	cu.	,782	82,5	5,5	do.	cis.	,797	78,	2,8	do.	do.	,870	77,2	2,0	do.	do.		
23	,808	74,7	0,8	do.	do.	,868	77,	1,8	cm.	do.	,752	82,3	4,1	do.	do.	,745	81,5	3,8	e.	do.	,751	78,	1,8	s. e.	cu.	,849	77,6	2,9	cm.	do.		
24	,777	76,	1,3	s. e.	do	,829	82,3	3,8	s. e.	do.	,708	85,3	6,6	s. w.	do.	,695	84,7	7,2	s. w.	cu.	,705	82,	4,8	cm.	cl.	,790	77,2	1,8	s.	cl.		
25	,780	76,	1,3	cm.	cu.	,842	81,	4,3	s. w	do.	,760	85,7	8,8	do.	do.	,752	84,7	7,7	n. w.	do.	,775	82,	5,7	do.	cu.	,860	76,2	3,2	e.	rn.		
26	,853	74,5	1,3	n.	do.	,927	80,3	5,3	n.	do.	,829	83,3	8,4	n. w.	do.	,829	83,	7,	do.	do.	,859	78,	2,8	n. w.	do.	,948	76,4	3,2	n. w.	str.	0,22	0,16
27	,934	74,5	1,	cm.	cl.	,993	80,	5,2	n. e.	do.	,887	85,5	9,	n.	do.	,883	83,5	8,	n. e.	do.	,898	81,5	7,3	n.	cl.	,978	78,8	5,0	n.	cl.		
28	,941	73,	2,3	n. e.	cis.	,994	82,	6,1	do.	do.	,872	86,7	10,8	n. e.	do.	,870	86,	10,8	do.	do.	,909	81,3	5,6	cm.	do.	,988	79,3	4,5	s.	cus.		
29	,946	75,5	2,8	cm.	cu.	,018	79,8	4,6	do.	cis.	,937	85,	1,8	do.	rn	,924	75,5	2,3	do.	cis.	,937	76,	2,1	do.	cis.	,995	76,0	2,7	e.	do.		
30	,955	73,5	1,3	n. e.	cis.	,009	77,	3,	do.	do.	,921	76,5	3.	do.	cis.	,919	76,	2,5	do.	do.	,898	75,	1,8	do.	do.	,952	74,1	3,7	n. e.	rn.	0,28	0,22
31	,893	73,	1,8	do.	rn.	,954	74,	1,1	do.	rn.	,832	76,5	2,3	do.	n.	,822	74.5	1,5	dc.	n.	,811	74,	1,3	do.	cy.	,863	73,6	1,0	do.	do.	0,75	0,65
Mean,	29,837	74,7	1,6			,898	81,5	5,7			,794	85,6	9,2			,789	84,1	8,3			,795	80,8	4,8			,850	78,7	4,2			8,15	6,01

Note.—On the 7th it blew a heavy gale, beginning in the north-east, and veering round to east, south, and south-west. As the Barometer was much affected thereby, its altitude on that day is omitted in the monthly averages.